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The effects of parent training interventions on parental self-efficacy for parents with young children with an autism spectrum disorder or other developmental disabilities: a systematic review

by

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DISSERTATION CONTENTS

PART A	PROTOCOL
PART B	OVERVIEW
PART C	ARTICLE
PART D	APPENDICES

PART A: PROTOCOL

PROTOCOL CONTENTS

ABSTRACT	8
1. BACKGROUND	10
1.1. Description of the condition.....	10
1.2. Description of the interventions	11
1.3. How the interventions might work	11
1.4. Justification of the review	12
2. METHODS/DESIGN	13
2.1. Criteria used in considering studies for this review	13
2.2. Search strategy for identification of studies	13
3. DATA COLLECTION AND ANALYSES	17
3.1. Selection of studies	17
3.2. Data extraction and management.....	17
3.3. Assessing risk of bias in included studies	18
3.4. Measures of intervention effect.....	18
3.5. Dealing with missing data	19
3.6. Assessment of heterogeneity.....	19
3.7. Subgroup analysis and investigation of heterogeneity	19
3.8. Presenting and reporting of results.....	20
4. Ethics	21
5. Discussion.....	22
6. References.....	23

ABSTRACT

Background:

One of the leading research priorities worldwide is the need to improve the lives of those with disabilities through effectively developing interventions that can be carried out by non-specialists. This is particularly important to increase access to care for those with disabilities in low and middle-income (LAMI) countries. Research has indicated that parent training (for parents of children with disabilities) is a prevalent intervention, with firm evidence for its effectiveness in well-resourced settings and promising evidence emerging for its usefulness in low-resourced settings. In recent years, there has been an interest in documenting changes in parents' behaviours as a result of the intervention(s). The primary parental outcome measure to date has been parental levels of stress. However, parenting self-efficacy is postulated to be an alternative parenting outcome measure. To date, no systematic review exists to determine the impact of parent training programmes on parenting self-efficacy beliefs.

Aims:

The aim of this systematic review is to carry out a quantitative review of parent training programmes for parents with young children with developmental disabilities, to assess whether or not these interventions are effective in producing an increase in parenting self-efficacy (PSE) levels when compared to standard care or no treatment.

Methods:

We will only include experimental studies specifically, randomised controlled trials. We will search databases, such as MEDLINE, EMBASE, PsycINFO, PubMed, Academic Search Premier, Africa-wide Information, Cumulative Index to Nursing and Allied Health (CINAHL), Education Resources Information Center (ERIC), Health Source (consumer edition) , Psych-articles, Google Scholar, Dissertation Abstracts International, Education Resource Information Centre and The Cochrane Library (Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Methodology Register In addition, reference lists will be manually searched for identifiable articles, abstracts, conference proceedings and campaign materials. The search will include Google scholar and other grey literature sites. Online early articles for journals that have developmental disabilities mentioned in their scope of practice will also be manually searched for relevant articles. In cases where potential articles are unobtainable, researchers will request the articles from

the citing authors. Data will be extracted using a homogenous data extraction form. The quality of every study shall be analysed in relation to performance bias, detection bias, attrition bias, and selection bias. Subsequent to this, a meta-analysis will be generated, analysing subgroups in accordance with the methods of parent training programmes. A narrative synthesis will be presented that will include visual depictions of the effects of the training programmes on parenting self-efficacy for the studies included in this review.

Discussion:

The results will be beneficial to public health officials, health-care professionals, and policy-makers. The use of PSE as an outcome measure for training programmes will be discussed.

Keywords: Child; Parent Training; Systematic Review; Autism Spectrum Disorders; Developmental Disabilities; Parents; Self Efficacy

1. BACKGROUND

1.1. Description of the condition

Normal development occurs at a rapid rate throughout the first few years of childhood. Development can be defined as an ongoing acquisition of new skills throughout life, which becomes important in children since the rate of development differs in children. Therefore, milestones are used as means to measure the acquisition of these skills across the different developmental domains. Children with *developmental delay* usually present with milestones that are below average, and have difficulties to achieve these required skills or functions. Examples of these are the abilities to see, walk, hear, conceptualise, talk and write including other functions appropriate for the specific age of the child (Motala, Fugaji, Davidson, & Levin, 2010). Many children with developmental delay may be diagnosed with a developmental disorder. The term developmental disorders can be used as a collective term, to describe a number of conditions associated with developmental delays. These disorders are classified into two broad categories, namely focal disorders and global disorders, each consisting of numerous specific sub-categories (Motala et al., 2010).

Disability-adjusted life years are the sum of years lived with disability and years of life lost as a result of premature mortality associated with having a disability (Murray et al., 2012). This term is used to depict the health gap in a population and is used to measure the state of a population's health in comparison to a normative goal (Murray et al., 2012). Studies reveal over 0.4% of all disability-adjusted life years can be accounted for by developmental disorders worldwide (Murray et al., 2012). For this reason, one of the leading research priorities is the need to improve the lives of those with disabilities through effectively developing interventions that improve health and quality of life outcomes of children with developmental disorders. Currently, the majority of research pertaining to developmental disorders and their management focuses on higher-income countries (HICs) (Kieling et al., 2011). However, low and middle income (LAMI) countries may have a higher prevalence of developmental disorders compared to higher-income countries (Maulik, Mascarenhas, Mathers, Dua, & Saxena, 2011). Within the South African context, researchers have acknowledged a shortage of dependable data describing the prevalence of disability in South Africa, with Schneider & Saloojee, (2007) estimating a prevalence of 5% and 6% of moderate and severe disability respectively (Schneider & Saloojee, 2007). The dearth of information pertaining to developmental disorders in LAMIs may be attributable to the lack of prevalence data, which may in turn, be affected by ineffective services tasked to identify and diagnose

developmental disorders. In addition, limited empirical research exists which evaluates the effectiveness of management strategies in these settings. Consequently, children with developmental disabilities and their families may not be able to access the services that they need in order to manage the child's disorder (Demyttenaere, Bruffaerts, Posada-Villa, & et al., 2004).

1.2. Description of the interventions

Considering the significant amount of time that a parent and child spend interacting with one another during pre-school years, Woods et al., (2011) suggest that primary caregivers (generally the biological parents) should be taught skills to support their child's development. For this reason, researchers propose parent training programmes that focus on increasing the quantity and quality of daily parent-child interactions. In doing so, it is hypothesised that the effects of these programmes will be maintained over a long-term period and will be generalised to the home context as well as additional settings external to the home (Roberts & Kaiser, 2011). Subsequently, there is a global emergence of evidence which suggests that psychosocial interventions can be effectively implemented by non-specialist providers (Einfeld et al., 2012). Evidence suggests that these psychosocial interventions are effective for parents of children with developmental disabilities particularly those with autism spectrum disorders and intellectual disabilities. However, the majority of the research has been conducted in HICs, and well-resourced settings (Rispoli, Neely, Lang, & Ganz, 2011). Reichow et al., (2013) recently conducted a systematic review of psychosocial interventions for children with developmental disorders and reported that interventions delivered by non-specialist providers have the ability to improve familial, behavioural and developmental outcomes. In contrast, Einfeld et al., (2012) have shown the effectiveness of interventions provided by parents for children with intellectual disabilities in LAMI countries (low-resourced settings). Therefore establishing effective early interventions which can be implemented by non-specialists (and particularly parents) has been noted as a leading research priority in order to provide better lives to those with either mental health conditions or developmental disorders (Collins, Patel, & Joestl, 2011).

1.3. How the interventions might work

There are numerous benefits associated with parents managing their child with a developmental disability. Parents become empowered by understanding their child's difficulties, and learn additional skills which make their parenting tasks easier to manage. Parents learn competent parenting methods initiated from an early age that ultimately

improves development, language capabilities, enhances school readiness, physical health and enhances the formation of meaningful relationships. Furthermore, parents are provided with intervention techniques and are taught how to incorporate them into activities of daily living, thus making the impact of the intervention more sustainable (Balton, 2011). For this reason, it is hypothesised that these effects will be maintained over a long-term period and will be generalised to additional settings outside the home (Roberts & Kaiser, 2011). Furthermore, parent training programme have the ability to improve familial, behavioural and developmental outcomes (Reichow et al., 2013).

These programmes can aid in increasing access to care for those with disabilities in LAMI countries, having limited access to services and trained health practitioners (Samuels, Slemming, & Balton, 2012). Irrespective of the exact content of the training programme, those that comprise of coaching/modelling, and direct teaching have been shown to be effective (Kaminski, Valle, Filene, & Boyle, 2008; Woods et al., 2011).

1.4. Justification of the review

The aim of this systematic review is to evaluate whether or not parental self-efficacy levels improves as a result of parenting interventions for parents of children with autism spectrum disorders and developmental disabilities. There is currently no meta-analysis to suggest that these interventions enhance parental self-efficacy levels. This information will aid public health officials and policy makers for future policy developments and to enhance evidence-based health care practices and research. Findings will provide a foundation from which suggestions can be extrapolated to determine the key characteristics of interventions with robust empirical support, as well as the feasibility of using parental self-efficacy as an outcome measure in evaluating their effectiveness. Our hypothesis is that parent training interventions enhance parental self-efficacy.

2. METHODS/DESIGN

The systematic review's methods will be conducted in line with those of the Cochrane Collaboration (JPT Higgins & Green, 2009).

2.1. Criteria used in considering studies for this review

Types of study designs

All randomised controlled trials using parent training interventions for parents of children with autism spectrum disorder and other developmental disabilities.

Types of participants

Parents of children (0-10 years) with established developmental disabilities including, but not limited to an Autism Spectrum disorder, Cerebral Palsy, Down syndrome, and multiple and/or significant disabilities. In addition, behaviour and conduct disorders and attention deficit/hyperactivity disorder will also be included. The decision to include conduct disorders was due to the fact that authors frequently report our conditions of interest (attention deficit/hyperactivity disorder) alongside conduct disorders.

Types of interventions

Intervention: Parent training, parent coaching, parent education or parent intervention programmes that are also psycho-educational or psychosocial in nature.

Waitlist control/ Control: No intervention or management as usual.

Types of outcomes

To determine the effect of parent training interventions on parental outcomes which fall under the parental self-efficacy construct, these include parental levels of competence and parental confidence.

2.2. Search strategy for identification of studies

We intend to carry out a detailed literature search for data pertaining to the use conduct parent training interventions. Relevant studies, irrespective of publication status and language, will be obtained. Advanced and complex searches will be conducted with guidance by a librarian.

The team will be made up of three main contributors:

- Ameer Steven-Jörg Hohlfeld (AH), who will be the primary investigator and will take responsibility for all aspects of the project.
- Michal Harty (MH), who will be responsible for independently extracting the data, and verifying data generated and collected. Furthermore, she has the primary function of the supervisor for the project.
- Mark Engel (ME), who will be responsible for oversight of analyses and general guidance in conducting the review. He possesses expertise in the methodology of conducting systematic reviews.

AH and MH will carry out an extensive and comprehensive search to find applicable studies irrespective of publication status or language.

Electronic Searches

The following journal databases, (but not limited to) will be searched:

- Medline
- EMBASE
- PsycINFO
- PubMed
- Academic Search Premier,
- Africa-wide Information, Cumulative Index to Nursing and Allied Health (CINAHL),
- Education Resources Information Center (ERIC),
- Health Source (consumer edition) ,
- Psych-articles, Google Scholar,
- Dissertation Abstracts International,
- Education Resource Information Centre,

The following trial registries, but not limited to these, will be searched:

- Cochrane Central Register of Controlled Trials (CENTRAL)
- World Health Organisation International Clinical Trials Registry Platform (ICTRP)

Keywords and medical subject heading (MeSH) terms will be used in various arrangements conditional to the specific database. Briefly, we will use a combination of the following terms to ensure inclusion of all relevant components of the PICO. The details are found in Table 1.

Table 1. Search strategy developed in MEDLINE

#1	parent*
#2	Famil*
#3	Mother*
#4	Father*
#5	Maternal*
#6	Paternal*
#7	#1 OR #2 OR #3 OR #4 OR #5 OR #6
#8	Parent* educat*
#9	Parent* train*
#10	Parent* interven*
#11	#8 OR #9 OR #10
#12	Disabil*
#13	Autism*
#14	Cerebral palsy
#15	Down syndrome
#16	Intellectual* disabil*
#17	Developmental* disabil*
#18	Established*
#19	Physical disabil*
#20	Mental retardation
#21	Cognitive disabil*
#22	#12 OR #13 OR #14 OR #15 OR #16 OR #17 OR #18 OR #19 OR #20 OR #21
#23	Parent* self-efficacy
#24	Parent* competence
#25	Parent* confidence
#26	#23 OR #24 OR #25
#27	#7 AND #11 AND #22 AND #26

Additional searches

The search strategy will be completed by searching the following databases:

- Google and Google Scholar
- Networked Digital Library of Theses and Dissertation

AH and MH will manually search reference lists of identified articles to identify titles of articles possibly meeting the inclusion criteria.

3. DATA COLLECTION AND ANALYSES

3.1. Selection of studies

AH will search databases namely: MEDLINE, EMBASE, PsycINFO, PubMed, Academic Search Premier, Africa-wide Information, Cumulative Index to Nursing and Allied Health (CINAHL), Education Resources Information Center (ERIC), Health Source (consumer edition) , Psych-articles, Google Scholar, Dissertation Abstracts International, Education Resource Information Centre and The Cochrane Library (Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), Cochrane Methodology Register). In addition, the reference lists of the relevant studies will be hand searched to identify missing articles, abstracts, and conference proceedings. Researchers will request unpublished and unobtainable articles whether from the corresponding authors or via the citing authors. The searchers will include Google scholar and other grey literature sites. Searches will have no language limitations. The first author will revise all relevant material obtained from the search. Once the titles and abstracts of the identified studies have been read, the full text studies will then be retrieved for every citation that potentially will meet inclusion criteria. Both AH and MH will revise the selected studies using a pre-designed study eligibility form to decide on the inclusion status. Uncertainties pertaining to the inclusion eligibility will be discussed. Colleagues fluent in the particular language of the study will translate non-English studies.

Methods used by both review authors will be uniform when searching for applicable studies, screening the titles and abstracts. Full-text articles will be acquired for those articles identified as possibly meeting the inclusion criteria. Thereafter the full-texts articles will be assessed independently to ascertain whether they meet inclusion criteria by both authors. In an event of disagreement pertaining to the inclusion or exclusion of articles, a discussion will be held with the third reviewer. The motivation for the excluded studies will be provided.

3.2. Data extraction and management

Attached as Appendix A.1. is the data extraction form that will be used by both AH and MH. Ambiguities of the articles shall be solved by means of discussion amongst AH, MH and ME. Information to be captured on the data extraction form includes the following:

- General details: Title, authors, publication status, year in which the study was conducted and details of other relevant studies cited.

- Inclusion criteria: the reviewers must confirm the inclusion criteria of each study for the proposed systematic review.

Inclusion criteria will be set, paying particular attention to the following:

- Details of the study: Type of study design, follow-up period.
- Details of participants: Number of participants, baseline characteristics, and parents used in the studies, a form of developmental disability and age of the children.
- Details of intervention: The study must report the outcomes of a parent training, parent education or parent intervention programmes. Parent interventions must be psycho-educational or psychosocial in nature. The setting of the intervention, nature, duration and context in which the intervention occurs will be captured.
- Details of control: Non-use of interventions, or care as usual.
- Details of outcomes: Parental-self-efficacy outcomes, parental competence or parental confidence.
- Information relating to risk of bias (see below).

3.3. Assessing risk of bias in included studies

The level of risk of bias will be independently assessed for each article meeting with the inclusion criteria. We will use the risk of bias tool and methodology suggested by the Cochrane Collaboration (Julian. Higgins & Altman, 2008). Details will be extracted from each study to determine, selection of participants for each study, sequence generation and randomisation, allocation concealment, blinding of participants and/or assessors, incomplete outcome data or missing data, selective outcome reporting (participants lost to follow-up) and other relevant biases.

Studies where random allocation was not carried out effectively, will be scored as having high, low or unclear risks of bias. In an event of disagreement, the scoring will be determined by consulting and discussing this with ME.

3.4. Measures of intervention effect

Data was analysed using Review Manager 5.3 (Cochrane Collaboration, 2008). The outcomes (parental self-efficacy, parenting competence, parenting confidence) will be considered as

continuous variables. The meta-analyses will be performed in addition, on each of the six subgroups. The random-effects model will be used where significant heterogeneity is found. The effectiveness of the interventions will be calculated as risk ratios and 95% confidence intervals.

3.5. Dealing with missing data

Every attempt will be made to contact authors if full articles or information on missing data is required.

3.6. Assessment of heterogeneity

Heterogeneity will be evaluated using a chi-squared test and the I^2 test (Higgins & Green, 2009). A meta-analysis will be favoured by a low degree of heterogeneity. Homogenous studies will have a pooled effect determined, and a fixed-effects model will thus be used. However, a random-effects model will be depicted subsequent to the high likelihood of there being studies with several intervention effects. A descriptive outline of the results will be presented if there is heterogeneity of the included studies.

3.7. Subgroup analysis and investigation of heterogeneity

In addition to assessing the levels of parenting self-efficacy, we also plan to analyse the following subgroups. The first will stratify studies according to the children's diagnoses, PSE levels of studies will be compared across the four different types of developmental disorders that we are interested in. The second subgroup analyses will be to compare PSE levels for studies including children with an average age five years and older to those that are younger than five years. The third subgroup will compare the PSE levels of studies targeting mothers as the sole receiver of the intervention to studies that have included either parent as the receiver. The fourth subgroup assesses the PSE levels of studies using the Parenting Sense of Competence tool compared to the lesser-used PSE tools. As the fifth subgroup, the PSE levels of studies using psychologists as parent coaches will be compared to those using non-psychologists as programmes administrators. Lastly, PSE levels of licensed studies will be compared to those without licensing.

Researchers will perform a sensitivity analysis to determine the study design's effect on the results of the meta-analysis. We will calculate the I^2 statistic for each analysis as a measure of the proportion of the overall variation that is attributable to between-study heterogeneity.

We will then analyse which meta-analysis model is appropriate for the studies included, based on the level of heterogeneity present.

3.8. Presenting and reporting of results

Results will be presented using a combination of figures, graphs, and tables. Sourcing and selection of studies included in this review will be explained through the use of figures. Excluded studies will be tabulated, and this will be accompanied with reasons for their exclusion. To interpret the effects of homogeneity between studies and the effects of homogenous studies, forests plots will be utilised. Chi-squared tests will be utilised to assess the homogeneity between studies for the assessment of the meta-analysis, with a low degree of heterogeneity being preferable. The use of fixed-effects models and pooled effects for homogenous studies will be determined. In addition, summary tables will be created if the use of forest plots are not possible or appropriate.

4. Ethics

There will be no direct engagements with human participants; furthermore, no primary conducted research shall take place. Published and publically accessible data will be used in the study, thus, the need for formal ethical approval is not a requirement (Emanuel, Wendler, Killen, & Grady, 2004). Ethical research depends on scientific validity, even when it is secondary research. Consequently, specialists experienced in both methodology and content will direct this study. Results of this study will be obtainable via the University's online library. The study will also be written up and submitted for publication in a peer-reviewed journal.

5. Discussion

Expected study implications

The results of this study will be beneficial to public health officials, health care providers, and policy-makers. The meta-analysis will assist in determining a potentially valid outcome measure for parent training programmes. Furthermore, the study will provide insights into the effectiveness of a number of parent training programmes currently in use within higher-income countries. Evidence will be evaluated in relation to its potential applicability within the South Africa context (and other LAMI countries), where research pertaining to parent training interventions are scant. Evidence pertaining to these forms of interventions are important for LAMI countries as they are seeking cost-efficient methods of addressing conditions with a comparatively high prevalence compared to higher-income countries. In brief, this review will emphasise domains potentially requiring future research, namely whether or not parenting self-efficacy can be altered by participation in a parent training programme.

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PART B: OVERVIEW

OVERVIEW CONTENTS

1. Introduction	3
2. Background	4
2.1. Definition of Developmental disorder	4
2.2. Epidemiology of developmental disorders	6
2.3. Management of developmental disorders	7
2.3.1. Early Childhood interventions.....	7
2.3.2. Parents as implementers of intervention	8
2.3.3. Parent training programmes	8
3. Parenting interventions.....	10
3.1. Design of parenting interventions	10
3.1.1. Registered and established parenting interventions	10
3.2. Other parenting interventions	15
4. Parental self-efficacy	17
4.1. Parental self-efficacy as an outcome of parent training programmes	17
4.2. Sources used to modify levels parent self-efficacy	18
4.3. Impact of Parental self-efficacy on parenting competencies.....	19
4.4. Assessing Parental self-efficacy.....	20
4.4.1 Description of assessment tools to measure PSE	21
5. The rationale and importance of this study.....	22
6. References	24

1. Introduction

One of the global research priorities is the need to improve the lives of individuals with disabilities through developing effective interventions that can be carried out by non-specialists. This becomes increasingly important for individuals living in low and middle-income (LAMI) countries, as it makes services more accessible. Research indicates that parent training programmes (for parents of children with disabilities) are effective forms of interventions. Empirical evidence exists that measures the effectiveness of such interventions in well-resourced settings whilst evidence is currently emerging pertaining to its usefulness in low-resourced settings. In most instances, changes in child behaviours are the primary outcomes that are measured. However, in recent years, there has been an interest in documenting changes in parents' behaviours because of such intervention(s). The primary parental outcome measure to date has been parental levels of stress but the parental self-efficacy (the belief that a parent holds in their ability to successfully complete parenting tasks) is postulated to be an alternative measure. To date, no systematic review exists to determine the impact of parent training programmes on parental self-efficacy beliefs (as the primary outcome of interest).

2. Background

2.1. Definition of Developmental disorder

Normal development occurs at a rapid rate throughout the first few years of childhood. Development can be defined as an ongoing acquisition of different and new skills throughout life, which becomes important in children since the rate of development differs in children. Therefore, milestones are used as means to measure the acquisition of these skills across the different developmental domains. Children with *developmental delay* usually present with milestones that are below average, and have difficulties to achieve these required skills or functions. Examples of these are the abilities to see, walk, hear, conceptualise, talk and write including other functions appropriate for the specific age of the child (Motala, Fugaji, Davidson, & Levin, 2010). Many children with developmental delay may be diagnosed with a developmental disorder. The term developmental disorders can be used as a collective term, to describe a number of conditions associated with developmental delays. These disorders are classified into two broad categories, namely focal disorders and global disorders, each consisting of numerous specific sub-categories (Motala et al., 2010). Motala et al., (2010) further elaborates on the categories, depicted in Figure1 below.

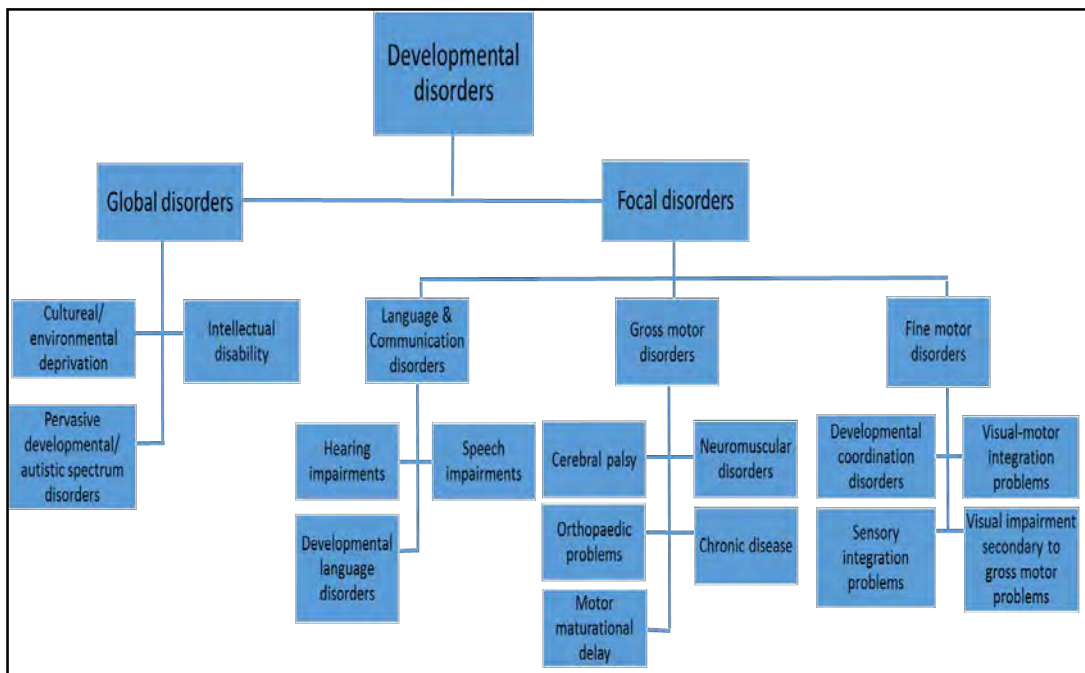


Figure 1. Developmental disorders and areas of developmental delay based on Motala et al., (2010)

Focal disorders have three categories which are language and communication disorders, gross motor disorders and Fine motor disorder. Language and communication disorders consist of hearing impairments, speech impairments and developmental language disorders. Gross motor disorders consist of cerebral palsy, orthopaedic conditions, and delays in motor maturation, chronic diseases, and neuromuscular disorders. Fine motor disorders consist of problems with sensory integration, Visual-motor integration, visual impairment secondary to gross motor conditions, sensory integration and developmental coordination disorders.

Global disorders also consist of three categories, these being deprivation in culture or environment, intellectual disabilities and lastly pervasive developmental/autistic spectrum disorder (Motala et al., 2010).

For the purpose of this systematic review, we have included a description of the developmental and conduct disorders which have been described according to the fifth edition of American Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-V) (American Psychiatric Association, 2013) in Table 1.

Table 1. Summary of developmental disorders based on the DSM-V (American Psychiatric Association, 2013).

Condition	DSM-V codes	Description
Autism Spectrum Disorder	299.0	Deficits of social interaction and social communication, restriction of repetitive patterns in their behaviour, interests or activities. Symptoms generally appear in periods of early development causing considerable deficits in social, academic, or occupational functioning.
Global developmental delay	315.8	Diagnosis retained for 5 years and younger. Failure to achieve expected milestones in development in various domains of intellectual functioning. These include children not old enough to partake in standardised intellectual testing.
Conduct disorders	313.81/ 312.34/ 312.32/ 312.89/ 301.7/ 312.33/ 312.32/ 312.9	Behavioural pattern: persistent and repetitive- dissocial, aggressive, or defiant conduct. Severe infringement of age-appropriate social standards; serious compared to ordinary childish mischief or adolescent unruliness; suggests a persistent display of behaviour (six months or longer). Impedes on social, academic, or occupational functioning.
Attention Deficit/Hyperactivity Disorder	314.0/ 314.1	Continuous display of hyperactivity-impulsivity and/or inattention impedes development or function. Numerous symptoms displayed prior to 12 years of age and presented in two or more surroundings. Impedes on social, academic, or occupational functioning.
Intellectual disability	319	Three criteria need to be met: Intellectual and adaptive functioning deficits including an onset of adaptive and intellectual deficits during their developmental phase.

In contrast to Motala et al. (2010), the DSM-V coding includes specific categories of conduct disorders and attention deficit/hyperactivity disorder, which we have considered for our study. Therefore, in this study, we have used a broad description of developmental disorders that include cerebral palsy (CP), Down syndrome, autism spectrum disorder (ASD), global developmental delay, as well as conduct disorders (CD) and Attention deficit/ hyperactivity disorder (AD/HD).

2.2. Epidemiology of developmental disorders

Disability-adjusted life years are the sum of years lived with disability and years of life lost as a result of premature mortality associated with having a disability (Murray et al., 2012). This term is used to depict the health gap in a population and is used to measure the state of a population's health in comparison to a normative goal (Murray et al., 2012). Studies reveal over 0.4% of all disability-adjusted life years can be accounted for by developmental disorders worldwide (Murray et al., 2012). For this reason, one of the leading research priorities worldwide is the need to improve the lives of those with disabilities through effectively developing interventions that improve health and quality of life outcomes of children with developmental disorders. Currently, the majority of research pertaining to developmental disorders and their management focuses on higher-income countries (HICs) (Kieling et al., 2011). However, low and middle-income (LAMI) countries may have a higher prevalence of developmental disorders compared to higher-income countries (Maulik, Mascarenhas, Mathers, Dua, & Saxena, 2011). Within the South African context, researchers have acknowledged a shortage of dependable data describing the prevalence of disability in South Africa, with Schneider & Saloojee, (2007) estimating a prevalence of 5% and 6% of moderate and severe disability respectively (Schneider & Saloojee, 2007). The dearth of information pertaining to developmental disorders in LAMIs may be attributable to the lack of prevalence data, which in turn may be influenced by ineffective services to identify and diagnose developmental disorders. In addition, limited empirical research exists which evaluates the effectiveness of management strategies in these settings. Consequently, children with developmental disabilities and their families may not be able to access the services that they need in order to manage the child's disorder (Demyttenaere, Bruffaerts, Posada-Villa, & et al., 2004).

2.3. Management of developmental disorders

2.3.1. Early Childhood interventions

Mental health care services and proficiently trained health practitioners who are able to deliver appropriate interventions to assist children with developmental disabilities and their families are scarce in LAMI countries (Dua et al., 2011; Eaton et al., 2011; Einfeld et al., 2012; Kieling et al., 2011; Patel, Singh, & Desai, 2009; World Health Organization, 2011). Consequently, an estimated 25% of individuals with developmental disabilities do not receive adequate interventions in these countries (Demyttenaere et al., 2004).

There are however various ways to manage children with these developmental delays. One systematic approach is the use of early childhood interventions which encompasses a co-ordinated family-centred approach (Dunst, 2007). There is an ever increasing body of empirical evidence suggesting the effectiveness of this approach (Moolman-Smook, Vermoter, Buckle, & Lindenberg, 2008; Wetherby et al., 2014). The numerous benefits associated with early childhood interventions include an increase in developmental, social and functional outcomes for children, as well as an increase in parental empowerment and a decrease in parental stress. Moreover, parents are frequently taught how to incorporate their newly learnt parenting skills and intervention techniques into activities of daily living, thus making the impact of the intervention more sustainable as the interventions can be practised daily (Balton, 2011).

While there is also an increasing demand by various spheres of the health care sector to develop and practice interventions that are evidence-based (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Coren, Barlow, & Stewart-Brown, 2003; Dretzke et al., 2009; Embry, 2004; Gutman & Feinstein, 2010; Stack, Serbin, Enns, Ruttle, & Barrieau, 2010). There is also an acknowledgement of the need to be sensitive to the social context in which the family's lives. The teaching of parents to provide better care and stimulation for children with disabilities in LAMI countries is a viable intervention alternative as services driven by health practitioners are overburdened or limited (Samuels, Slemming, & Balton, 2012). Furthermore, there is a growing emphasis on establishing healthy environments as early as possible in which children can develop, and parents can play a pivotal role in creating nurturing home environments (Balton, 2011; Dunst, 2007; Einfeld et al., 2012; Moolman-Smook et al., 2008).

2.3.2. Parents as implementers of intervention

Considering the significant amount of parent-child interaction time spent during pre-schooling years, Woods, Jeanne, Friedman, & Murch (2011) suggest that the primary caregivers (generally the biological parents) should be taught skills to support their child's development. For this reason, researchers propose parent training programmes that focus on increasing the quantity and quality of daily parent-child interactions. In doing so, it is hypothesised that the effects of these programmes will be maintained over a long-term period and will be generalised to the home context as well as additional settings external to the home (Roberts & Kaiser, 2011). Subsequently, there is a global emergence of evidence which suggests that psychosocial interventions can be effectively implemented by non-specialist providers (Einfeld et al., 2012). Evidence suggests that these psychosocial interventions are effective for parents of children with developmental disabilities particularly those with autism spectrum disorders and intellectual disabilities. However, the majority of the research has been conducted in HICs, and well-resourced settings (Rispoli, Neely, Lang, & Ganz, 2011). Reichow et al., (2013) recently conducted a systematic review of psychosocial interventions for children with developmental disorders and reported that interventions delivered by non-specialist providers have the ability to improve familial, behavioural and developmental outcomes (Brian Reichow, Servili, Yasamy, Barbui, & Saxena, 2013). In contrast, Einfeld et al., (2012) have shown the effectiveness of interventions provided by parents for children with intellectual disabilities in LAMI countries (low-resourced settings). Therefore establishing effective early interventions which can be implemented by non-specialists (and particularly parents) has been noted as a leading research priority in order to provide better lives to those with either mental health conditions or developmental disorders (P. Y. Collins, Patel, & Joestl, 2011).

2.3.3. Parent training programmes

Evidence suggests that parenting training programmes aimed at teaching parents new skills to promote the development of their children with developmental disabilities are beneficial interventions (Brookman-Frazee, Stahmer, Baker-Ericzén, & Tsai, 2006; Matson, Mahan, & LoVullo, 2009; C. Roberts, Mazzucchelli, Taylor, & Reid, 2003). Researchers concluded that these interventional methods are cost-effective and that they enhance developmental skills in cognition, language and social domains (Matson et al., 2009; Warren et al., 2015). Irrespective of the exact procedure of the parenting interventions, those that comprise of

coaching/modelling, and direct teaching have been shown to be the most effective (Kaminski, Valle, Filene, & Boyle, 2008; Woods et al., 2011). Figure 2, adapted from Bandura, (1997) and Woods et al., (2011), depicts the cycle of learning that occurs during parenting interventions when these teaching strategies are implemented. These components encourage positive parenting, pro-active problem-solving strategies and opportunities to practice between intervention sessions (Matthew R. Sanders & Kirby, 2012; Woods et al., 2011). The overarching hypothesis is that teaching parents to think analytically during challenging times will have a positive effect on the child's development (Kaminski et al., 2008).

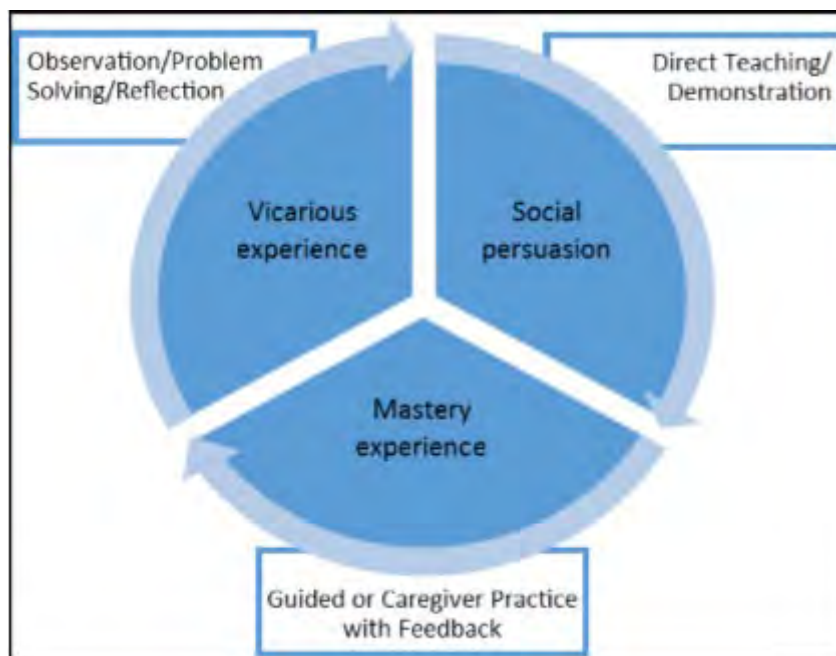


Figure 2. Parental self-efficacy sources used in parent training programmes, based on (Bandura, 1997; Woods et al., 2011)

Numerous parenting training programmes have been developed over recent years. The methods of delivery include large seminar programmes, small group programmes, individual programmes (individual coaching sessions), telephone-assisted programmes, self-directed programmes, and online parenting programmes (Dretzke et al., 2009; Mazzucchelli & Sanders, 2011; Nowak & Heinrichs, 2008; Matthew R. Sanders, Baker, & Turner, 2012; Matthew R Sanders, 2008).

Sanders and Kirby (2014) suggest that the most experiential of these consist of, but are not limited to, the Incredible Years training series (C Webster-Stratton, 1998), Parent

Management Training—Oregon Model (Forgatch & Patterson, 2005), Parent-Child Interaction Therapy (Fernandez & Eyberg, 2009) and the Triple P-Positive Parenting programmes. In addition, many researchers have introduced and trialled other forms of parenting interventions which have similar content and implementation methods. For the purpose of this study, all types of parenting training programmes with an active psycho-educational or psychosocial component will be considered for inclusion in this systematic review. These will be discussed in the subsequent sections below.

3. Parenting interventions

3.1. Design of parenting interventions

3.1.1. Registered and established parenting interventions

The interventions described in this section are those for which data from randomised controlled trials are available. There are a number of other promising accredited interventions, such as early bird (and early bird plus) (National Autism Society, UK), the Hanen early language parent program (Girolametto, Greenberg, & Manolson, 1986), as well as the Parent Management Training—Oregon Model (Forgatch & Patterson, 2005), which have not been included in this discussion due to the nature of the inclusion criteria for this current systematic review undertaken. Table 2 provides outlines of the parent training programmes employed by studies meeting the inclusion criteria this systematic review.

3.1.1.1. The Incredible Years training series

The Incredible Years training series is aimed at training parents, children, teachers and families to prevent, reduce and manage behavioural conduct problems in children ranging from two to ten years of age (Webster-Stratton, 2001). The training series consists of three types of interventions, namely parent training, teacher training and child training. For the purpose of this study, we will explore parent training methods. The objectives of this approach are to improve parental competence and strengthen familial relations, promote the child's social competencies, promote teacher competencies and enhance home-school networks (Carolyn Webster-Stratton, 2001). Improving parental competence and strengthen familial relations is achieved by improving parental communication and parenting skills. In addition, the programme encourages positive means of discipline rather than violent or critical approaches, by facilitating anger management and teaching problem-solving skills to

the parents. These skills aim to improve partnerships between parents and teachers, as well as improve the family's school participation and family support networks. The Incredible Years training series consists of four different programmes, the Incredible Year's basic parent training programme, the Incredible Years school-age basic parent training program, the Incredible Years advanced parent training program and lastly the Incredible Year's education parent training program (Carolyn Webster-Stratton, 2001).

3.1.1.1.1. The Incredible Years basic parent training program

The Incredible Years basic parent program was developed with objectives to establish holistic management methods for young children with conduct problems. In addition, it aims to endorse social competence (Webster-Stratton, 2001) and is focussed on children aged two to seven years of age. The training is conducted over a 12-week period. It can be presented to groups of 10 to 14 participants whereby 250 video illustrations are shown to a group of parents followed by a discussion. This intervention teaches parents problem-solving approaches as well as natural and logical consequences; "ignore" and "timeout" techniques as non-violent means of disciplining a child. The intervention is administered by group leaders who encourage group discussions and ways to resolve identified problems (Webster-Stratton, 2001).

3.1.1.2. Triple-P Positive Parenting Program

According to Sanders, Baker, & Turner (2012), there has been an increased number of public health approach interventions in Australia aimed at assisting parents in preventing and managing children with disruptive behaviours. The Triple-P Positive Parenting Program is one such intervention that has been widely used and researched. It consists of multiple levels of interventions created upon self-regulation and cognitive-behavioural theories focussed on those that promote social learning. These interventions are designed to include various levels of intensity and focus on various target populations (Sanders & Kirby, 2012; Sanders, 2008).

The aims of this programme are to improve the self-sufficiency, knowledge, confidence, resourcefulness and skills of parents with preadolescent children. It also aims to promote language, emotional, social, behavioural and intellectual competencies of the child by means of positive parenting practices. Sanders, (1999) states that encouraging constructive environments that are safe for children, nurturing, non-violent, and engaging and absolved from conflict can achieve these aims.

Triple-P is delivered in a variety of formats which include face-to-face programmes delivered on an individual basis (M R Sanders, Markie-Dadds, Tully, & Bor, 2000; Turner & Sanders, 2006), group programmes (Morawska, Haslam, Milne, & Sanders, 2011; Zubrick et al., 2005), self-directed learning modules, as well as intensive online versions of the programme (Markie-Dadds & Sanders, 2006; Morawska & Sanders, 2007; Matthew R. Sanders et al., 2012). These examples demonstrate how this programme can be adapted to meet the requirements to suit the individual needs of families (Sanders, 1999). In addition (Tellegen & Sanders, 2013) have cited four meta-analyses that have shown this programme to be efficacious and effective (De Graaf, Speetjens, Smit, De Wolff, & Tavecchio, 2008; De Graaf et al., 2008; Nowak & Heinrichs, 2008; Thomas & Zimmer-Gembeck, 2007). Table 2 includes some of the more common variants of this programme.

3.1.1.3. Early Start Denver model

The Early Start Denver Model (ESDM) was developed based on comprehensive knowledge pertaining to the effects of autism, on a young child growth and learning (Dawson et al., 2010). It combines various techniques from the Denver model and Pivotal Response Training (Vismara, Colombi, & Rogers, 2009). It aims to improve functioning in all developmental domains, by decreasing the symptoms of ASD. Thus, the programme focuses on improving the child's verbal language, nonverbal communication, as well as cognitive and socio-emotional capabilities. This is achieved by teaching parents to establish an environment conducive to teaching that will promote positive relationships between social partners (parents) and children (Vismara et al., 2009). The programme is standardised and individualised as necessitated by the parent. It combines developmental, behavioural and relationship-based factors into a play-based approach, according to Smith, Rogers, Dawson (2008) as cited in (Dawson et al., 2010). To encourage greater developmental growth in children with ASD, a parent-delivered ESDM (P-ESDM) was developed by Vismara et al., 2009 (Dawson et al., 2010).

In the parent coaching intervention based on the Early Start Denver Model (P-ESDM), therapists train parents to implement the components of the ESDM. These included common principles of behaviour change, utilisation of tactics to carry out daily activities, planning daily schedules, managing events or routines commonly carried out at home with the child, as well as obtaining the child's attention of the child and stimulating communicative gestures and vocalisation (Vismara et al., 2009).

Table 2. Summary of regularly used parent training programmes for developmental disabilities

Intervention	Outcomes	Format	Key teaching activities	Bandura influence on self-efficacy
Primary Care Triple-P (Sanders, 1999)	Enhance: Ability to manage discrete child problems	80 minutes; 3-4 sessions	Advice/ problem-solving strategies Rehearsal of strategies Self-evaluation skill training	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
Standard Triple-P (Sanders, 1999)	Enhance: Positive parenting skills; parent-child interactions; generalise parenting skills to numerous behaviours	90 minutes; 10 sessions	Modelling of strategies Rehearsal of strategies Feedback from instructors Homework activities skill training	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
Triple -P Online (Turner & Sanders, 2011)	Enhance: Parental efficacy in child behaviour management; parental adjustments; self-regulation; management; Belief; Problem-solving Reduce: Dysfunctional parenting; parenting anger; parental discord	Self-directed pace; 8 interactive online modules and exercises	Instructions video content Video modelling parent skills, "vox pops" Reviews and feedback Interactive exercises Problem-solving and decision making, session content reviews: worksheets and podcasts skill training	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
Group Triple-P (Sanders, 1999)	Enhance: Parenting competence Reduce: Child's behavioural problems e.g. aggression	120 minutes; 4 sessions	Homework tasks skill training; discussions, role-play, observation and feedback video demonstration of positive parenting skills.	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal

Table 2. Summary of regularly used parent training programmes for developmental disabilities (continued)

Self-directed Triple-P (Connell et al., 1997)	Enhance: Generalization & maintenance of parenting skills; independent problem-solving and self-sufficiency; enhance parent-child interaction	Self-directed pace; 10 self-directed workbook modules	readings and homework activities telephone consultation goal setting self-monitoring parents manage misbehaviour	Personal experience Verbal/social persuasion Emotional/physiological arousal
Stepping stones Triple-P (standard) (Sanders, 1999)	Enhance: Parenting knowledge, skill and confidence	60-90 minutes; 10 individual sessions or 120 minutes; 10 group sessions	workbook to set and monitor their own goals for behavioural change; active skills training and support: modelling, role plays, feedback, specific homework tasks	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
The Incredible Years basic parent training program (Webster-Stratton, 2001)	Enhance: Parent skills with regards to playing/involvement; Praise/Rewards; Limit setting; Discipline Enhance: Parent competence	120 min; 12-14 sessions	videotapes self-administered manual, assignments home activities direct teaches discipline techniques; "time out" and "ignore" problem-solving strategies group discussion of video vignettes play activities	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
Early Start Denver Model (Dawson et al., 2010; Rogers et al., 2012)	Reduce: Parenting stress Enhance Parenting competence	60 minutes; 12 sessions	play activities	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal

3.2. Other parenting interventions

There are numerous parent training programmes that are not commonly utilised; a summary of the programmes included in this study are presented in Table 3. Health practitioners that possess a qualification in health sciences with extensive experience in managing children with developmental disabilities generally administer these interventions. The primary aim of these interventions are to enhance parent's understanding and knowledge of the specific developmental disabilities, and in so doing maximise the capabilities of the child. Common secondary aim(s) include enhancing parental self-efficacy and decreasing parental stress levels. Parents learn strategies to manage common behavioural difficulties they experience. They can then apply these skills to a number of everyday family activities and routines. The sessions range 60 to 120 minutes per session. The total number of sessions within the programmes vary considerably. Depending on the delivery of the intervention, parents may receive training in a clinical environment that reflects their home or everyday environments. In addition, these interventions may make use of video recordings of parents practising learnt techniques at home, with the purpose of viewing them during the training session. This creates additional opportunities to provide feedback to parents (Grahame et al., 2015; Poslawsky, Naber, Bakermans-, et al., 2014; Reitzel et al., 2013; Scarpa & Reyes, 2011).

Table 3. Summary of less commonly used parent training programmes for developmental disabilities

Intervention	Outcomes	Format	Key teaching activities	Bandura influence
Managing Repetitive Behaviours Programme (MRB©) (Grahame et al., 2015)	Enhance: Parent knowledge, skills, confidence Enhance: Ability to manage child's condition	120 minutes; 8 sessions	Videotapes Skill learning Practice skill Group discussion Problem-solving	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
VIPP-AUTI (Poslawsky et al., 2014)	Enhance: Parental Self-efficacy Enhance: Knowledge and management of child's condition; joint attention and play skills; Parent-child interaction	60-90 minutes; 5 sessions	Teaching behavioural strategies; Video feedback; Problem-solving; Parent coaching; Revisions/reviews	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
Functional behaviour skills training (Reitzel et al., 2013)	Enhance: Competence, Knowledge, skills. Reduce: Parenting strains	120 minutes; 20 sessions	Hands-on skills training Video feedback; Individualised; problem-solving Parental support Revisions/reviews; Group discussions; Homework assignments;	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
Centre based intervention (Roberts et al., 2011)	Enhance: Competence, coping skills, Knowledge, quality of life and positive behavioural support Reduce: stress	120 minutes; 40 sessions	Skill training Group discussions Problem-solving	Personal experience Verbal/social persuasion Emotional/physiological arousal
Parent based therapies (PT) (Sonuga-Barke et al., 2001)	Enhance: Parenting skill teaching child attention and behavioural organisation Reduce: Defiant and difficult behaviour	60 minutes; 8 sessions	Review and feedback Skills training Observe parents & feedback Behavioural diary (reflect and act on received advice)	Personal experience Vicarious experience Verbal/social persuasion Emotional/physiological arousal
Parent based meetings improving knowledge (Susman, 2012)	Enhance: Knowledge/ awareness of child's participation in age-appropriate activities Enhance: Parental self-efficacy	120 minutes; 20 sessions	Group discussion; Information material; Homework assignments, Reviews and revisions	Personal experience Verbal/social persuasion Emotional/physiological arousal

4. Parental self-efficacy

4.1. Parental self-efficacy as an outcome of parent training programmes

There is an increasing interest in parenting cognitions, especially parent self-efficacy (PSE) as one of the main variables when assessing parenting skills (Jones & Prinz, 2005). Researchers classify PSE as a cognitive construct and define it as a parent's assessment of their competence in carrying out roles as parents (De Montigny & Lacharité, 2005; Jones & Prinz, 2005). Researchers with a focus on the psychosocial development of children with developmental and conduct disorders have indicated the positive impact that parenting self-efficacy may have in the development of a child by shaping the way parents approach and execute parenting tasks (Ardelt & Eccles, 2001; Coleman & Karraker, 2003; Črnčec, Barnett, & Matthey, 2008; De Montigny & Lacharité, 2005; Jones & Prinz, 2005; Kendall & Bloomfield, 2005).

The PSE construct is primarily grounded in Bandura's social-cognitive theory (Bandura, 1977a, 1977b, 1989, 1997) (P. K. Coleman & Karraker, 2003; P. P. K. Coleman & Karraker, 1997; De Montigny & Lacharité, 2005). Bandura (1997) defined perceived self-efficacy as an individual's belief in their own capabilities to arrange and carry out tasks or actions to yield a specific achievement (Bandura, 1997). Perceived self-efficacy has also been defined as an individual's confidence in their abilities to implement and regulate their own performance, by managing external occurrences shaping their lives (P. P. K. Coleman & Karraker, 1997). An individual's attitude which they hold of their personal efficacy influences their motivation levels, the choices they make in life, their susceptibility to stress and depression, and ability to perform tasks (Bandura, 1997). Self-efficacy is not a static belief and is thought to be malleable to change by a number of factors (Bandura, 1989). Consequently, it can be improved by modifying specific experiences.

Self-efficacy is commonly considered to be domain specific. However, this construct may well be carried over into areas analogous in their concepts (Bandura, 1997). Parental self-efficacy is one such domain, which has received attention the literature (Bloomfield & Kendall, 2012; P. K. Coleman & Karraker, 2000; Črnčec et al., 2008; De Montigny & Lacharité, 2005; Jones & Prinz, 2005; Teti & Gelfand, 1991).

The concept of parenting self-efficacy provides profound insight into the subjective and objective parenting responses. These insights help health practitioners to improve parenting practices and prevent poor parenting techniques that may have an undesirable effect on the

child (P. P. K. Coleman & Karraker, 1997). In other words, parents facing numerous stressors who have high levels of PSE are able to still deliver affirmative experiences to their children (Elder, 1995). Consequently, developers of therapeutic psychosocial interventions have paid considerable attention to mechanisms whereby efficacy beliefs in parents can be enhanced (Bloomfield & Kendall, 2007, 2012; Hudson, Campbell-Grossman, Fleck, Elek, & Shipman, 2003; Jones & Prinz, 2005; Salonen et al., 2011; M R Sanders & Woolley, 2005).

4.2. Sources used to modify levels parent self-efficacy

According to Bandura (1989), there are four primary ways in which self-efficacy can be modified. These four influences serve to either enhance or decrease perceived levels of parenting competence. The first and most important source of information one uses to develop self-efficacy beliefs is that of enactive mastery (personal) experience. This results from prior accomplishment in particular activities. Bandura (1989) states that this the source which carries the greatest potency to modify current levels of PSE. Failure to carry out a task generally lowers self-efficacy while successful experiences enhance it. This source is especially significant for those without prior established beliefs. Improved self-efficacy can be generalised to various circumstances once firmly established, and becomes evident in comparable tasks where self-efficacy had previously improved (Bandura, 1989). Enhancing PSE levels is thus achieved by desensitising parents, by teaching them new problem-solving techniques, and by allowing them to experience success in situations in which they previously found challenging (Bandura, 1977a).

A second likely source for improving personal self-efficacy is achieved through vicarious experiences. Compared to enactive mastery experience this source is more vulnerable to change and is a weaker form of learning. With this source, the individuals learn by observing challenging activities being successfully executed by competent Models. This in return allows the observer to re-evaluate their own mastery capabilities in relation to similar challenges they would encounter. It is especially useful when the observer sees themselves as being similar to the observed model (Bandura, 1997). Thus having group discussions with others, facing similar challenges and watching videos or live models carrying out challenging tasks are examples of activities that may enhance PSE levels by using vicarious experience.

A third source to improve self-efficacy beliefs is that of verbal/ social persuasion, whereby others provide informed verbal feedback on an individual's capabilities pertaining to a certain task (Bandura, 1997). Encouragement from others is believed to be useful in improving self-

efficacy and skill, whereas discouragement has the opposite effect (Bandura, 1986). Within the context of parent training, the use of observation and then feedback from a coach or professional would be examples of some teaching activities which capitalise on this source of PSE.

Emotional/physiological arousal is the fourth method to modify self-efficacy beliefs. Parents may experience increased stress, anxiety and or fatigue. This stressful physiological may make it harder to experience success (Bandura, 1986). Therefore, reducing negative emotional arousal to subjective fears (through effective management) would subsequently enhance performance, and improve perceived self-efficacy (Bandura, 1986). This is achieved through the knowledge and skills components of parent training. Providing parents with additional information and alternative ways of approaching some of their most challenging parenting tasks would be examples of how parent training programmes address this source of PSE.

Thus, PSE is a significant factor pertaining to the quality of parenting. Furthermore, it has been suggested that a high level of parental self-efficacy will cause parents to think and act in ways that will optimise the developmental outcomes for the child (Hill & Bush, 2001). Given the nature of the existing parenting programmes and the teaching activities which encourage the improvement of self-efficacy as parents progress through the programme, the impact of modifying PSE will be described below.

4.3. Impact of Parental self-efficacy on parenting competencies

Researchers have acknowledged PSE as an important variable in ascertaining parental capabilities (Jones & Prinz, 2005). Researchers have shown an association between parental behaviours and PSE. An increased level of parenting competence in mothers had a positive association with maternal PSE (Teti & Gelfand, 1991). Furthermore, PSE is shown to be inversely related to parenting stress and depressive symptoms (Cutrona & Troutman, 1986; Leahy-Warren, McCarthy, & Corcoran, 2012; Rezendes & Scarpa, 2011; Salonen et al., 2009). Subsequently, children are also protected from developing anxiety disorders through higher levels of PSE when PSE is associated with positive parenting practices (Hill & Bush, 2001). Conversely, lower levels of PSE was shown to predict a mother's use of poor discipline practices (M R Sanders & Woolley, 2005). It is evident that research does suggest proactive parenting practices and adaptive child behaviours are linked with parental self-efficacy (Sevigny, 2013).

However, PSE has been associated with advantageous child development and adjustment (Ardelt & Eccles, 2001; Coleman & Karraker, 2003). Ardel and Eccles's (2001) model has shown that the level of PSE is directly proportional to parents' own optimistic beliefs, outlooks, and attitudes, which consequently leads to their children embracing these cognitive characteristics which are displayed through their behaviour. Subsequently leading to heightened levels of success in the child (Ardelt & Eccles, 2001). This reflects Bandura's observational learning theory on modelling, which proposed that children embrace and execute actions that they observe their parents modelling (Bandura, 1982). Numerous studies have shown an association between low levels of parent-reported PSE and their children having increased behavioural difficulties (Day, Factor, & Szkiba-Day, 1994; Hill & Bush, 2001) Furthermore higher levels of PSE has been shown to have a positive associated with increased levels of social competence in children (Guimond, Wilcox, & Lamorey, 2008).

4.4. Assessing Parental self-efficacy

Literature suggests three methods of assessing PSE introduced by Coleman and Karraker (2003), namely the domain-general, domain specific and task specific. The domain-general method interprets parental the self-efficacy pertaining to parenting in general. These tools focus on capturing general feeling about a parent's parenting abilities. The use of this approach does not allow for the evaluation of specific parenting tasks or behaviours (De Montigny & Lacharité, 2005). Hence, domain-general tools are not able to provide information pertaining to parent's perceptions of their abilities to stimulate child development within the different parenting domains (such as discipline, communication etc.). Both the domain-specific and task-specific tools focus on capturing information about parent's beliefs in their ability to parent a particular child with reference to a number of different parenting domains (Seigny, 2013). Task-specific methods emphasise the perception held by the parent in their ability to carry out specific and separate tasks associated with certain parenting domains (Coleman & Karraker, 2003). Jones and Prinz (2005) have stated that capturing domain specific information is imperative, as the makeup of a parent's behaviour is multifaceted yet intricate, and thus may differ within each of the domains.

According to De Montigny and Lacharité, (2005) and Jones and Prinz (2005), the domain-specific method is a measure favoured by the majority of researchers to examine PSE, who wish to examine specific parenting behaviours. In addition, Bandura (1989, 1997) insists increased precision can be obtained by predicating actual behaviour which is captured on the

domain-specific measure of self-efficacy, rather than domain-general measures (Bandura, 1989, 1997). Furthermore, task-specific measures have the ability to predict behaviour in a more focused parenting aspects and may have the most relevance to the clinical setting (Day et al., 1994; Hoover-dempsey, Bassler, & Brissie, 1992). However, in this review, we will specify whether we feel a tool is domain-specific or domain-general, but will not make a distinction between domain-specific and task-specific measures.

4.4.1 Description of assessment tools to measure PSE

Tools that were developed using the domain-specific and domain-general approaches to measuring the levels of PSE have been described separately below. The two most common tools which were used to document parenting self-efficacy in the randomised controlled trials included in this systematic review are discussed below and remaining tools are summarised in Table 4.

4.4.1.1 Parenting sense of competence (PSOC)

This tool is an example of a domain-general tool to measure parenting self-efficacy. Researchers suggest this to be a widely used measure of parental self-efficacy and parental competence (Coleman & Karraker, 2003; Sanders & Woolley, 2005). This is a 16-item Likert-scale questionnaire; however, although some studies report the use of a 17-item version. The PSOC has 6 point scale that ranges from one (strongly agree) to six (strongly disagree). Parents answer seven questions to assess their efficacy. This section measures parents' competence and their ability to solve problems as typically faced by parents. Satisfaction is assessed with nine questions, measuring motivation, frustration and anxiety (Johnston & Mash, 1989). The PSOC total score is the sum of efficacy and satisfaction sub-scores. A high PSOC total score equates to a greater sense of competence.

4.4.1.2 Parenting tasks checklist (PTC)

Sanders & Woolley (2001) developed a 28-item tool known as the "parenting tasks checklist" that measures task-specific self-efficacy of a mother. Setting-Self-efficacy and Behavioural Self-Efficacy are two sub-scales that make up this task-specific tool. Higher scores on the parenting task checklist reflect higher levels of self-efficacy.

Setting Self-Efficacy measures parents' confidence in managing challenging behaviours in various surroundings. The settings have been based on the identified 14 settings best known to be difficult for parents, identified by The Parenting and Family Support Centre at the University of Queensland. Thus, the setting subscale contains 14-items, with a scale that

ranged from 0 to 100, 0= "certain I cannot do it" to 100= "certain I can do it". It illustrates surroundings where disobedience may arise in a child and asks parents to rate their confidence in their ability to manage their child's behaviour in this setting. This subscale has a reported internal consistency using Cronbach's alpha of 0.91.

The Behavioural Self-efficacy sub-scale consists of 14 highest reported difficulties on the ECBI problem Scale. This subscale measures parent's confidence in managing child behaviours that are challenging. This subscale consist of 14 items, with a scale that ranged from 0 to 100, where 0= "certain I cannot do it" to 100= "certain I can do it". This subscale has a reported internal consistency using Cronbach's alpha of 0.97.

Table 4. Summary of Parental self-efficacy questionnaire tools used to measure PSE in this systematic review

Measure	Author	Domain Type	Scale	Total score	Number of items
Parenting Sense of Competence (PSOC)	Johnston & Mash (1989)	Domain-general	Likert-scale; 1-6;	High score= high Competence	16
Parent Self-Efficacy	Soironoff & Farbotko (2002)	Domain specific	6-point scale; 0-5	High score= high Competence	15
The Parenting Tasks Checklist (behaviour)	Sanders & Woolley (2001)	Domain specific	100 point; 0-100	High score= high Competence	14
Parent Perception Questionnaire	Roberts et al., (2011)	Domain-general	5-point; 1-5	High score= high Competence	6
Parental efficacy questionnaire (PEQ)	Poslawsky et al., (2014)	Domain specific	5-point; -2- +2	High score = high Competence	22
Caregiving self-efficacy	Heller et al., (1999)	Domain specific	5-point; 1-5	High score= high Competence	6

5. The rationale and importance of this study

Over the last four decades, there has been a gradual trend to encourage non-specialised individuals to manage disabilities in LAMI countries with the aim to improve coverage, decrease costs and ensure equal access to care for all individuals requiring care (Robertson, Emerson, Hatton, & Yasamy, 2012). The need for this approach to health care provision

stems from a dearth of trained health practitioners skilled in managing individuals with developmental disorders in resource poorly resourced settings such as LAMI countries (Einfeld et al., 2012).

A review of early childhood developmental interventions in poorly resourced settings suggests various effective elements that should be incorporated into training programmes. Firstly, early interventions have the greatest influence on a child's potential development and growth and for that reason, early identification and management of developmental disabilities should be prioritised. Secondly, involving parents in improving their child's abilities has benefits for both parents and children. Lastly, parent-mediated interventions are inexpensive and have been shown to increase parental self-efficacy levels (Carter et al., 2011)

Encouragingly, some researchers postulate that interventions provided by parents would be beneficial in LAMI countries as the effectiveness of interventions provided by parents or non-specialists in HICs to children with either intellectual disabilities or autism spectrum disorders has shown to be effective (Einfeld et al., 2012; Brian Reichow et al., 2013). Unfortunately, a recent review of the literature revealed that there is a scarcity of well-conducted randomised controlled trials assessing the effectiveness of non-specialised interventions for children with developmental disorders in LAMI countries (Einfeld et al., 2012; Hastings, Robertson, & Yasamy, 2012; Brian Reichow et al., 2013).

Even though it is prudent to conduct efficacy studies in LAMI countries (given the paucity of such evidence), it is important to identify the outcomes by which existing parent training programmes can be effectively evaluated. There is a current systematic review underway which will evaluate the family quality of life of parents as a potential parental outcome (Reichow et al., 2014). However, to the best of our knowledge no systematic review exists which investigates whether or not parenting self-efficacy could be another such outcome in determining the effectiveness of parent training programmes in enhancing the well-being of parents. In addition, there are no randomised controlled trials assessing PSE as an outcome in LAMI countries. Thus, the primary aim of this systematic review is to assess the immediate change in the summative PSE levels following parent training programmes for parents of children with developmental disorders. Results from this review will give researchers in LAMI countries an idea as to whether or not PSE can be used as an outcome if studies similar to those reported in this review are carried out in LAMI contexts in future.

6. References

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PART C: ARTICLE

ARTICLE CONTENTS

1. Introduction	5
2. Methods	11
2.1. Eligibility criteria	11
2.2. Protocol and search strategy.....	11
2.3. Data extraction	12
2.4. Outcome categories	12
2.5. Data analyses	13
2.6. Risk of bias	13
3. Results.....	15
3.1. Description of studies.....	15
3.2. Treatment effects	20
3.2.1. Summative PSE measures (21 studies) (Figure 3)	20
3.2.2. Subgroup analyses	21
3.3. Effects of Heterogeneity.....	23
3.4. Risk of bias for all included studies	23
4. Discussion	25
4.1. Main findings	25
4.1.1. PSE according to child diagnosis	25
4.1.2. Age	26
4.1.3. Parents	26
4.1.4. Intervention characteristics	26
4.1.5. Outcomes of interest.....	27
4.2. Findings on the effects of Heterogeneity.....	28
4.3. Risk of bias within studies	28
4.4. Strengths.....	28
4.5. Limitations and future research directions.....	29
5. Conclusion.....	30
6. References	31

Abstract

Background: A leading research priority worldwide is the need to improve the lives of those with disabilities through the effective development of interventions that can be carried out by non-specialists. Recent research has indicated that parent training interventions have shown to benefit both children with, and parents of children with disabilities.

Aims: This systematic review sought to assess the effectiveness of interventions aimed at increasing parental self-efficacy levels in parents of young children with developmental disabilities.

Methods and Procedures: We conducted a broad literature search across a number of databases to identify all relevant prospective studies meeting our study objective. Articles were selected using predefined criteria and data were extracted onto a purposely-designed data extracted form.

Results and Outcomes: Parent training programmes resulted in a statistically significant increase in parental self-efficacy levels (standardised mean difference, 0.51 (95% CI, 0.27-0.76); 21 studies; Random-effects; I^2 , 73%) relative to baseline measurements. This effect was consistent in parents of children <5 years, children with ADHD and/or conduct disorders or non-specific developmental disorders, ASD and, where training was conducted by non-psychologists.

Conclusion and Implications: Parent training programmes are effective in increasing parental self-efficacy in parents of children with developmental disabilities.

Keywords: Child; Parent Training; Systematic Review; Autism Spectrum Disorders; Developmental Disabilities; Parents; Self Efficacy

What this paper adds

This results from this systematic review showed that parent training programmes have an overall effectiveness in enhancing PSE levels, suggesting that parents do benefit more when being taught management techniques in caring for their child. Furthermore, parents will benefit more when initiating intervention soon after their child's diagnoses rather than delaying the management. This paper has also shown health practitioners other than psychologists are successfully able to implement training programmes that enhance PSE.

These findings are important given the dearth of health practitioners in LAMI settings able to provide children diagnosed with developmental or conduct disorders with appropriate care. Although no studies were found which measured PSE to have been conducted and interventions designed for LAMI settings, it may be viable to adapt existing parent training programmes to be implemented in LAMI settings (Reichow, Servili, Yasamy, Barbui, & Saxena, 2013).

1. Introduction

The term developmental disorder is widely used to describe children with global and focal disorders (Motala, Fugaji, Davidson, & Levin, 2010). According to Motala et al. (2010), global disorders refer to disabilities that affect global intellectual development, including pervasive developmental (PD)/ autism spectrum disorders (ASD). They may result from environmental factors such as poverty, abuse, deprivation or genetic or familial factors. Focal disorders, on the other hand, refer to a specific developmental domain such as language, communication, gross and fine motor disorders (Motala et al., 2010).

Disability-adjusted life years are the sum of years lived with disability and years of life lost as a result of premature mortality associated with having a disability (Murray et al., 2012). It depicts the health gap in a population as it used to measure the state of a population's health in comparison to normative goals (Murray et al., 2012). Studies reveal over 0.4% of all disability-adjusted life years can be accounted for by developmental disorders worldwide (Murray et al., 2012). A recent systematic review suggested that the global burden of disease arising from the presence of developmental disorders is increasing (Murray et al., 2012).

The majority of research pertaining to developmental disorders and their management focuses on higher-income countries (HICs) (Kieling et al., 2011). However, low and middle-income (LAMI) countries may have a higher prevalence of developmental disorders compared to HICs (Maulik, Mascarenhas, Mathers, Dua, & Saxena, 2011). In South Africa for example, Schneider & Saloojee (2007) estimated the prevalence of developmental disorders to be as high as between 5% and 6% (Schneider & Saloojee, 2007). To decelerate this growing burden of disease it has been argued that the need to build a healthy basis for children to develop as early as possible is imperative (Collins, Maccoby, Steinberg, Hetherington, & Bornstein, 2000; Coren, Barlow, & Stewart-Brown, 2003; Dretzke et al., 2009; Embry, 2004; Gutman & Feinstein, 2010; Stack, Serbin, Enns, Ruttle, & Barrieau, 2010).

The increasing body of empirical evidence suggests biopsychosocial aspects for both parents and children may improve through early initiated interventions (Dunst, 2007; Moolman-Smook, Vermoter, Buckle, & Lindenberg, 2008; Wetherby et al., 2014). The numerous benefits include an increase in parental empowerment, decrease in parental stress and an increase in developmental, social and functional outcomes for the children. However; researchers have noted that early healthcare interventions of young children have been neglected over recent years. This has been proposed as one explanation for why LAMI countries such as South Africa have fallen short in effectively addressing its growing child

health problems (Chopra et al., 2009). Many LAMI countries also lack sufficiently skilled health practitioners to initiate and sustain such early interventions (Einfeld et al., 2012).

South Africa is one of the many LAMI countries experiencing a dearth of specialised health practitioners skilled in managing children with developmental disorders. This impacts on the inability of families to access specialised care, thus limiting the availability of early interventions for children with developmental disorders (Einfeld et al., 2012; Samuels, Slemming, & Balton, 2012; Uys, 2009). Consequently, this leads to children not receiving adequate care, which may have a negative effect on the progress of their developmental outcomes (Samuels et al., 2012). The dearth of available health practitioners able to work with children with developmental disorders and their families can be mitigated by introducing parent training programmes; a number of which have been designed and tested globally over the past few decades (Arthur, Bennett, Stanush, & McNelly, 1998; Kaminski, Valle, Filene, & Boyle, 2008; Salas & Cannon-Bowers, 2001).

Considering the significant amount of time parents and children spend interacting with one another during the child's pre-school years, Woods et al., (2011) suggest that the primary caregivers (generally the biological parents) should be taught skills to support their child's development. The majority of parent training programmes comprise of skills training, parent education, parent support and/or parent coaching, and as a result, are said to be psychoeducational or psychosocial in nature (Matson, Mahan, & LoVullo, 2009; C. Roberts, Mazzucchelli, Taylor, & Reid, 2003; Matthew R. Sanders & Kirby, 2012; Matthew R. Sanders, 2012). Parents are typically then given opportunities to practice newly learnt skills in their home environments between sessions. The methods of delivery may include large seminar programmes, small group programmes, and individual coaching sessions. The formats include telephone-assisted programmes, face-to-face programmes, self-directed programmes, and online parenting programmes (Dretzke et al., 2009; Mazzucchelli & Sanders, 2011; Nowak & Heinrichs, 2008; Matthew R Sanders, Baker, & Turner, 2012; Matthew R Sanders, 2008). Figure 1 is a depiction of the proposed learning cycle that occurs during parenting interventions.

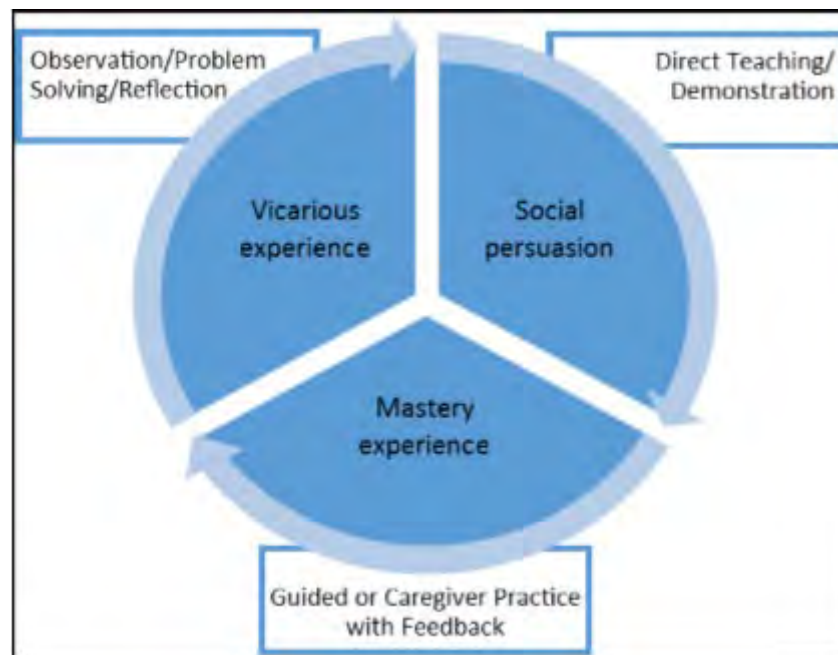


Figure 1. Parental self-efficacy sources used in parent training programmes, based on (Bandura, 1997; Woods et al., 2011)

Parent training programmes have shown to be effective in improving the psychological strain faced by parents and symptoms experienced by their children. The effectiveness of these programmes is achieved irrespective of the content, or delivery methods utilised (Kaminski et al., 2008; Woods et al., 2011). Moreover, parents are taught intervention techniques which can be implemented on a daily basis and incorporated into their activities of daily living, thus making the impact of the intervention more sustainable (Balton, 2011; Matthew R. Sanders & Kirby, 2012). Parents thus learn competent parenting methods to improve their child's language capabilities, enhance their school readiness, and promote their physical health (Gutman & Feinstein, 2010; Moffitt et al., 2011; Muthen, 2006; Stack et al., 2010). Interventions such as these are effective ways of increasing access to care for those with disabilities in LAMI countries with limited access to services and trained health care professionals (Samuels et al., 2012). As such, parent training programmes may make a significant contribution to a public health approach in LAMI settings (Einfeld et al., 2012; Reichow et al., 2013).

The primary aims of the above interventions are to reduce the impact of the challenges faced by the family of these children, through reducing the child's behavioural, emotional and developmental difficulties (Reichow et al., 2013). In addition, parent training programmes

have psychosocial health benefits for parents. These benefits include the improvement of parental self-efficacy (PSE) levels (Barlow, Coren, & Stewart-Brown, 2002).

Researchers with a focus on the psychosocial development of children with developmental and conduct disorders have indicated the importance that PSE may have in the development of a child (Ardelt & Eccles, 2001; Coleman & Karraker, 2003; Črnčec, Barnett, & Matthey, 2008; De Montigny & Lacharité, 2005; Jones & Prinz, 2005; Kendall & Bloomfield, 2005). The PSE construct is primarily grounded in Bandura's social-cognitive theory that has been defined as the belief in one's own abilities to arrange and carry out tasks or actions to yield a specific achievement (Bandura, 1977a, 1977b, 1989, 1997). This affects the decision of the tasks an individual carries out, the level of enthusiasm to accomplish the tasks, and the extent of perseverance when faced with difficulties (Bandura, 1997). Self-efficacy, as a construct, is thus deemed malleable.

Due to the changing nature of self-efficacy, an individual's beliefs which they rely on to undertake certain tasks or changing circumstantial strains can be improved by modifying or adjusting specific components of self-efficacy (Bandura, 1997). The concept of self-efficacy provides a profound insight into the understanding of the subjective and objective parenting responses in clinical settings. These insights help health practitioners to improve and prevent poor parenting techniques that may have an undesirable effect on the child (Coleman & Karraker, 1997). In other words, parents who face numerous stressors but have high levels of PSE are still able to deliver affirmative experiences to their children (Elder, 1995). Consequently, developers of therapeutic psychosocial interventions have paid considerable attention to mechanisms whereby self-efficacy beliefs in parents can be enhanced (Bloomfield & Kendall, 2007, 2012; Hudson, Campbell-Grossman, Fleck, Elek, & Shipman, 2003; Jones & Prinz, 2005; Salonen et al., 2011; M R Sanders & Woolley, 2005)

According to Bandura (1989), there are four primary ways in which self-efficacy can be modified. They serve to either enhance or decrease perceived levels of parental self-efficacy. The first and most important source of information one uses to develop self-efficacy beliefs is that of enactive mastery (personal) experience. This results from prior accomplishment in particular activities. It is thought to be the source of greatest potency and impact of evidence to assess one's abilities. Enhancing PSE levels is thus achieved by, desensitising parents; teaching them problem-solving techniques, and allowing them to experience success in situations in which they previously found challenging (Bandura, 1977a).

A second likely source for improving personal self-efficacy is achieved through vicarious experiences. The individuals learn by observing challenging activities carried out by competent models. This in return allows the observer to re-evaluate their own mastery capabilities in relation to similar challenges they would encounter. It is especially useful when the observer sees themselves as being similar to the observed model (Bandura, 1997). Thus having group discussions with others facing similar challenges, or watching videos or live models carrying out challenging tasks are activities that may enhance PSE levels.

A third mechanism to improve self-efficacy beliefs is the use of verbal/ social persuasion, whereby others provide informed verbal feedback of an individual's capabilities pertaining to a certain task (Bandura, 1997). Encouragement from others is believed to be useful in improving self-efficacy and skill, whereas discouragement has the opposite effect (Bandura, 1986). Within parenting programmes, feedback from the interventionists may provide this source of modification.

The Fourth and last way self-efficacy beliefs can be modified are through emotional/ physiological arousal. Parents may experience stressful physiological responses which include increased stress, anxiety and/or fatigue, making it harder to experience success (Bandura, 1986). Therefore, reducing negative emotional arousal to subjective fears (through effective management), would subsequently enhance performance, and improve perceived self-efficacy (Bandura, 1986).

PSE is a significant factor pertaining to the quality of parenting. Furthermore, it has been suggested that a high level of parental self-efficacy will cause parents to think and act in ways, which will optimise the developmental outcomes of their children (Reichow, Servili, Yasamy, Barbui, & Saxena, 2013). Allowing parents to take on more responsibility enhances their levels of self-efficacy that will, in turn, allow the parents to carry out the management of their child more effectively (Barlow et al., 2002).

Conducting this systematic review of randomised controlled trials (RCTs) carried out in High-income countries is an important first step in determining whether parent training programmes for parents of children with developmental disorders will enhance PSE levels and ultimately lead to an improvement in the functional outcomes for their children. We hope to use the data from this review to guide the development and implementation of parent training programmes within LAMI settings such South Africa. To our knowledge, there have been no systematic reviews of RCTs that have been conducted to assess the effects of

parent training interventions on PSE for parents with young children with an autism spectrum disorder or other developmental disabilities. The primary focus of this review is to evaluate the immediate change in PSE levels of parents with young children diagnosed either with a developmental or conduct disorder after undergoing a parent training programme.

This review consisted of seven aims. The first aim was to assess the immediate change in summative PSE levels following parent training programmes for parents in the intervention arms. The second aim of the review was to assess the change in PSE levels when stratifying studies according to the child's diagnosis. The third aim was to assess the change in PSE levels for interventions directed at children younger than the age of five years compared to studies directed at children five years and older. The fourth aim of the review was to assess the change in PSE levels comparing programmes directed solely at mothers and comparing findings to studies not differentiating between parents receiving the intervention. The fifth aim was to assess the change in PSE levels by comparing trademarked or copyrighted interventions to those without licencing. The penultimate aim was to assess the change of PSE levels for studies stating they used a psychologist to administer the interventions compared to those where other health practitioners implemented the intervention. The final aim was to assess the change in PSE levels in studies using the Parenting Sense of Competence (PSOC) (Johnston & Mash, 1989) as a PSE assessment tool compared to the less frequently used assessment tools found in this review. The last aim of the review was to conduct a moderator analysis (assess heterogeneity) to compare the treatment effects across the different kinds of parent training programmes.

Hypothesis

We hypothesised that there would be a significant positive effect size for PSE levels when combining all studies. Furthermore, larger effect size would be associated with licenced interventions than non-licenced ones was foreseen, and great gains in PSE levels in studies targeting children younger than five years of age compared to those five years and older.

2. Methods

2.1. Eligibility criteria

Studies selected for this review needed to meet the following inclusion criteria:

- a) The study needed to be a randomised controlled trial using parent training interventions for parents with children diagnosed with developmental disabilities or conduct disorders.
- b) Caregivers need to be parents of the children aged (0-10 years) with established developmental disabilities including, but not limited to, an autism spectrum disorder, cerebral palsy, Down syndrome, multiple and/or significant disabilities and behaviour and conduct disorders.
- c) Interventions needed to include elements of parent training, parent coaching, parent education or training that are also psychoeducational or psychosocial in nature.
- d) The control groups needed to receive no intervention or care as usual.
- e) Programmes needed to report on parental outcomes that fall under the parental self-efficacy construct, including parental levels of competence and confidence.
- f) The study needed to state the means, standard deviations and sample sizes either when contact was made with the author or in the publication.

Studies were excluded if:

- a) Parental self-efficacy levels were not reported.
- b) The means, standard deviations and sample sizes were not reported and attempts were made to contact authors.
- c) Duplicate findings were previously published.
- d) There were no control groups.
- e) Full-text articles were not accessible to the researchers, and/or corresponding authors were unable to provide data in time.

2.2. Protocol and search strategy

Relevant studies were obtained using various strategies, an example of the search strategy used can be found in Appendix B, Table B.1. Ameer Hohlfeld (AH) extensively searched databases, without any language or time limitations. Databases searched were: MEDLINE, EMBASE, PsycINFO, PubMed, Academic Search Premier, Africa-wide Information, Cumulative Index to Nursing and Allied Health (CINAHL), Education Resources Information Center (ERIC), Health Source (consumer edition), Psych-articles, Google Scholar, Dissertation Abstracts

International, and The Cochrane Library (Cochrane Database of Systematic Reviews, Cochrane Central Register of Controlled Trials (CENTRAL), and Cochrane Methodology Register). In addition, we manually searched reference lists of relevant studies to identify any missing articles, abstracts, conference proceedings. Furthermore, we searched reference lists and requested unpublished manuscripts from the corresponding authors or from authors citing articles that we wanted, but were unobtainable using databases to which we had access. Searches furthermore included Google scholar and other grey literature sites. We also manually searched the reference lists of articles assessing interventions for children with developmental disabilities their scope of practice. AH then revised all relevant material obtained from the search. After reading the titles and abstracts of the identified studies, we retrieved the full-text studies for every citation potentially meeting inclusion criteria. Both AH and Michal Harty (MH) individually evaluated the full text articles using a pre-designed study eligibility form to decide on the inclusion status (Figure 2.). Authors discussed uncertainties pertaining to inclusion eligibility (where possible).

2.3. Data extraction

AH and MH independently extracted the data using a homogenous data extraction form (Appendix A.1), which they then crosschecked. Mark Engel (ME) settled discrepancies discussion where necessary. Information extracted from the studies were: Country in which the study was conducted, study design, sample size, child diagnosis, mean age of the child in years and standard deviation, target parent for which the intervention was aimed at, name of the parenting intervention programme, coach/ trainer administering the intervention and the tool used to measure PSE. We extracted means, standard deviations, and sample sizes for each relevant intervention group measuring PSE for the analysis. Only the baseline scores and first recorded post intervention PSE scores were extracted.

2.4. Outcome categories

This review assessed PSE as the dependent variable. Where possible we only extracted PSE scores from studies using standardised interventions if the study also tested modified or enhanced versions of the interventions. Included studies used questionnaires consisting of different scales to measure the changes in PSE levels. These questionnaires include the Parenting Sense of Competence (PSOC) questionnaire, the Parenting Tasks Checklist (PTC), Parental Self-Efficacy questionnaire, Parental efficacy questionnaire, Parent Perception questionnaire and the Caregiving self-efficacy tool.

2.5. Data analyses

The standardised mean difference (SMD) was used to assess the overall change in PSE levels because studies used different scales to measure the mean change in PSE levels (Higgins & Green, 2009). We calculated the I^2 statistic for each analysis as a measure of the proportion of the overall variation that is attributable to between-study heterogeneity (Hozo, Djulbegovic, & Hozo, 2005). Data was analysed using Review Manager 5.3 (Cochrane Collaboration, 2008). The outcomes (parental self-efficacy, parenting competence, parenting confidence) were considered as continuous variables. The meta-analyses were carried out, in addition, on each of the six subgroups. Where significant heterogeneity was found, the random-effects model was used.

Some studies combined the subscales scores producing a PSOC total score (n=7) others reported the PSOC efficacy separately (n=8). For the self-efficacy tools (the PSOC and the PTC) which had two subsections and a total score the efficacy score and the behavioural score were extracted respectively. Where these subscale scores were not provided, the total score for the scale was then used. We have also chosen to extract data for behaviour self-efficacy in studies assessing PSE with the parenting tasks checklist, as the focus of this study aims to assess PSE levels in dealing with a child's behavioural difficulties.

Studies evaluating more than one intervention had data extracted from the standard interventions and not the adapted formats. These standard interventions may more externally generalizable to the LAMI context.

One study ((Connell, Sanders, & Markie-Dadds, 1997) directed the intervention at both parents, and unlike other studies included in this review, they stratified the mean PSE scores of mothers and fathers. (Hastings & Brown, 2002) suggests that self-efficacy may have a larger role to play in mediating the impact of child behaviour problems on parental well-being for the parent most closely involved in the care of the child, which is likely to be the mother. Thus, we only extracted data recorded for mothers and not fathers. We then used the mean PSE scores recorded for the mothers and analysed this with other studies that directed their interventions towards mothers.

2.6. Risk of bias

The Preferred Reporting Items for Systematic Review and Meta-Analyses (PRISMA) statement suggests that methods describing the assessment for risk of bias be included in meta-analyses or systematic reviews (Moher, Liberati, Tetzlaff, & Altman, 2009). Thus, we

individually inspected the following components of each included study for risk of bias as suggested by. The analysis looked at the selection of participants for each study, sequence generation and randomisation, allocation concealment, blinding, incomplete outcome data or missing data (attrition bias), selective outcome reporting and other sources of bias. Random allocation was scored as having a high, low or unclear risk of bias according to established methods (Higgins & Altman, 2008). In an event of disagreement between authors, the scoring was determined through consultation and discussion with the ME.

3. Results

3.1. Description of studies

Figure 2 depicts a flow diagram of the literature search results. We obtained 549 titles and abstracts from electronic databases and trial registries. However, not all of these were in the English language. An additional 55 references were found through manually searching the reference lists of included studies. Two of these could not be accessed for in full-text version and authors were thus contacted. A total of 604 studies were retrieved and once duplicate studies were removed, 443 studies remained. A further 355 articles were excluded based on examination of title and abstracts after which, 88 articles were potentially eligible for inclusion, pending full-text assessment. A native French speaker translated a French language article. Finally, 21 articles met our inclusion criteria.

Table 1 summarises the characteristics of the included studies. There were 1469 families who participated in the studies, the sample sizes ranged from 11 to 305. Of the 21 studies the majority of child diagnoses included Attention deficit/hyperactive disorder (AD/HD) or conduct disorders (CD) (nine studies), and Autism spectrum disorders (ASD) (eight studies). The remainder consisted of non-specific developmental disorder (NSDD) (three studies) and Cerebral palsy (CP) (one study). The majority of studies were conducted in Australia (n=12), with two studies each conducted in the U.K and Hong Kong, while one study was conducted in each of the following countries the U.S.A, Portugal, Canada, Netherlands, and Israel. The children's ages ranged from one to ten years. Fifteen studies had a mean children's age that was younger than five years, and six studies reported a mean age older than five years. Seven studies specifically recorded PSE scores on mothers, of these; six studies directed their interventions solely at mothers. The remaining 14 studies did not specify who received the intervention thus most likely combining PSE scores of either the mother or father receiving the intervention, without stratifying the outcomes.

Parent training programmes were not standardised across studies. Of the better-known programmes, twelve studies assessed different forms of the *Triple P-Positive Parenting Program*®, two other studies assessed the *Incredible Years* basic parent training program, and one tested the parent-administered version of the *Early Start Denver Model*. The remaining six studies trialled less commonly known interventions. Nineteen of the 21 studies had copyright or trademark licences for the interventions employed in the study. Furthermore, the interventions were administered either by psychologists (n=10) or by health practitioners (n=11).

PSE levels were assessed using different measures: 15 studies used the Parenting Sense of Competence assessment (PSOC), two studies used different formats of the Parenting Tasks Checklist (PTC), and the remaining four studies employed less commonly utilised PSE assessment tools. The list of excluded studies and the reason for exclusion has been tabulated in Table B.2 of Appendix B.

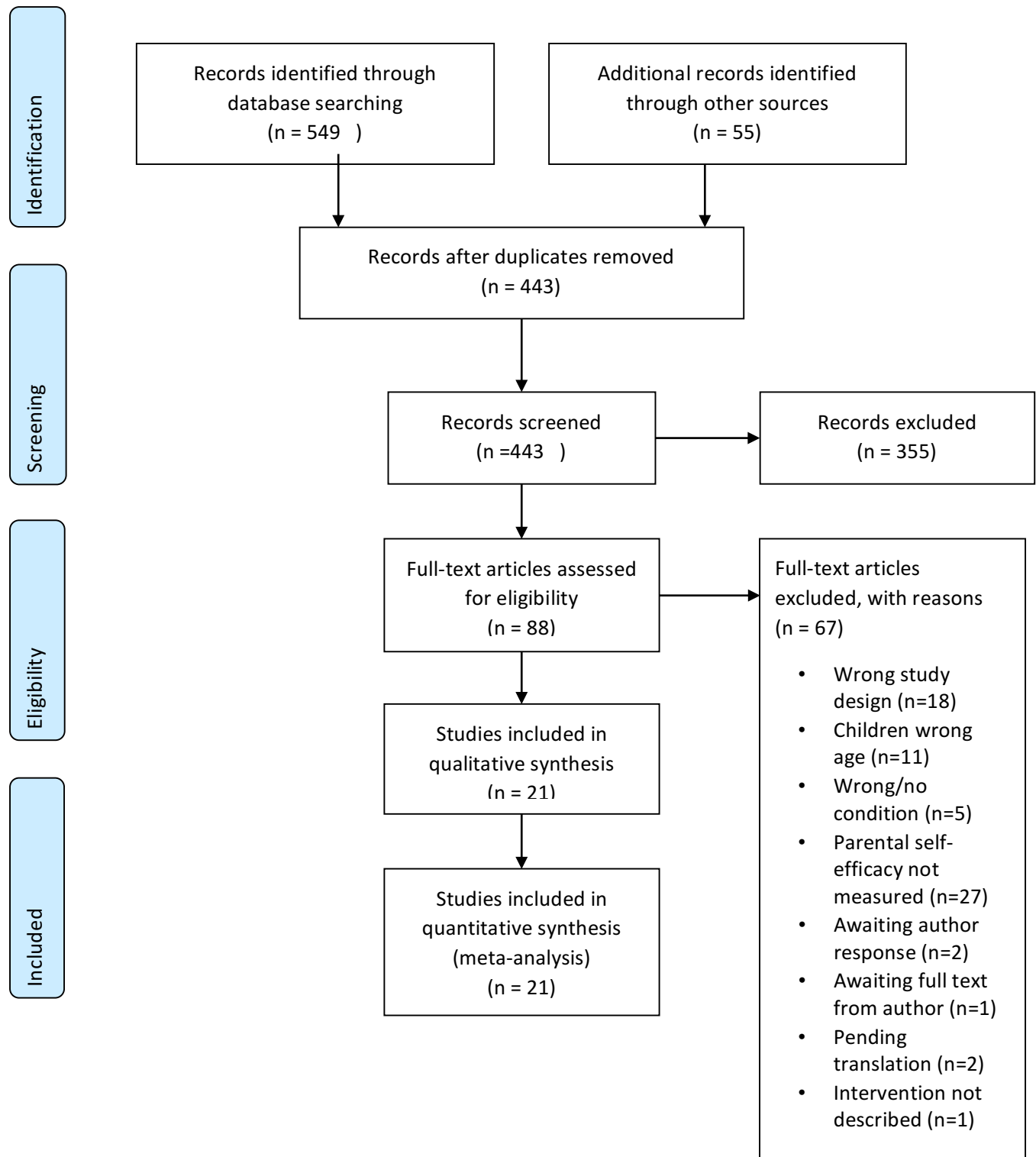


Figure 2. PRISMA flow chart presenting the documentation and selection of included studies in the systematic review. Adjusted from (Moher et al., 2009)

Table 1. Characteristics of randomised controlled trials conducted globally meeting inclusion criteria

Study authors(year)	Country	Sample size	Programme type	Target condition of children	Child mean age (range)	Target parent	Coach/trainer	Outcome measure
Au et al., (2014)	Hong Kong	11	Triple-P (SSTP, group)	AD/HD, CD	7.69 (5-10)	Non-specific	Psychologist	PSOC (total)
Azevedo et al., (2013)	Portugal	100	IY	AD/HD	4.65 (3-6)	Mothers	Psychologist	PSOC (total & efficacy)
Bor et al., (2002)	Australia	87	Triple-P (Standard)	AD/HD, CD	3.42 (3- 4)	Mothers	Psychologist	PSOC (total)
Cassidy (2001)	Australia	17	Triple-P (SSTP, Self-directed)	NSDD	4.38 (2-7)	Mothers	Non-psychologist	PSOC (total)
Connell et al., (1997)	Australia	23	Triple-P (self-help)	AD/HD, CD	4.27 (2-6)	Mothers	Non-psychologist	PSOC (total & efficacy)
Estes et al., (2014)	USA	82	P-ESDM	ASD	1.75 (1-2)	Non-specific	Psychologist	PSOC (total & efficacy)
Gardner et al., (2006)	UK	76	IY	AD/HD, CD	5.9 (2-9)	Non-specific	Non-psychologist	PSOC (total)
Grahame et al., (2015)	UK	45	MRB	ASD	5.13 (3-7)	Non-specific	Psychologist	Parent Self-Efficacy
Harrison (2006)	Australia	28	Triple-P (SSTP group)	NSDD	3.5 (1.5-5)	Non-specific	Non-psychologist	PSOC (total & efficacy)
Leung et al., (2003)	Hong Kong	69	Triple-P (group)	AD/HD, CD	4.23 (3-7)	Non-specific	Non-psychologist	PSOC (total & efficacy)
Markie-Dadds & Sanders (2006)	Australia	41	Triple-P (self-help)	AD/HD, CD	3.91 (2-6)	Non-specific	Psychologist	PSOC (efficacy)

Plant & Sanders (2007)	Australia	74	Triple-P, SSTP (Standard)	NSDD	4.59 (<6)	Non-specific	Psychologist	PSOC (total)
Poslawsky et al., (2014)	Netherlands	78	VIPP-AUTI	ASD	3.58 (1.33- 5.08)	Non-specific	Non-psychologist	PEQ
Reitzel et al., (2013)	Canada	15	FBST*	ASD	5.03 (3.17- 6.83)	Non-specific	Non-psychologist	PSOC (total)
Roberts et al., (2011)	Australia	85	Building Blocks©	ASD	3.52 (2.2- 5)	Mothers	Non-psychologist	PPQ (Confidence)
Sanders et al., (2000)	Australia	305	Triple-P (Standard)	AD/HD, CD	3.41 (3-4)	Mothers	Psychologist	PSOC (total)
Sanders et al., (2012)	Australia	116	Triple-P (online)	AD/HD, CD	4.67 (2-9)	Non-specific	Non-psychologist	PTC setting & PTC behavioural
Sonuga-Barke et al.,(2001)	England	78	PT	AD/HD, CD	±3 years (range not reported)	Mothers	Non-psychologist	PSOC (efficacy)
Susman (2012)	Israel	15	Education intervention package*	Cerebral Palsy	3.67 (1.5-6)	Non-specific	Non-psychologist	Caregiving self-efficacy
Tellegen & Sanders (2014)	Australia	64	Triple-P (PCSSTP)	ASD	5.68 (2-9)	Non-specific	Psychologist	PTC setting & PTC behavioural
Whittingham et al., (2009)	Australia	59	Triple-P (SSTP)	ASD	5.91 (2-9)	Non-specific	Psychologist	PSOC efficacy

Note: SSTP, Stepping Stones Triple-P; AD/HD, Attention deficit/ hyperactive disorder; CD, conduct disorder; PSOC, Parenting Sense of Competence; IV, the Incredible Years basic parent training; NSDD, non-specific developmental disorders; USA, United states of America; P-ESDM, Parent Early Start Denver Model; ASD, Autism Spectrum disorder; UK, United Kingdom; MRB, Managing repetitive Behaviours Programme; VIPP-AUTI, Video-feedback Intervention to promote Positive Parenting adapted to Autism; PEQ, Parental efficacy questionnaire; FBST, Functional Behavior Skills Training; PPQ, Parent Perception Questionnaire; PTC, Parenting Tasks Checklist; PT, Parent training; PCSSTP, Primary Care Stepping Stones Triple-P. *non-licensed intervention

3.2. Treatment effects

3.2.1. Summative PSE measures (21 studies) (Figure 3)

Compared to baseline measurements, parent training programmes resulted in a statistically significant increases in PSE levels across all studies, irrespective of assessment tool employed, ($n= 574$; SMD, 0.51 (95% Confidence Interval (CI), 0.27; 0.76); $I^2=73\%$). Table 2 displays the summative results including those from the six subgroups.

Table 2. Summative PSE outcomes and the six-subgroup analyses.

Subgroups analysed	<i>k</i>	Participants	<i>d</i> (overall effect size)	<i>d</i> Lower 95% CI	<i>d</i> Upper 95% CI	I^2
Summative PSE measures	21	574	0.51	0.27	0.76	73%
Child diagnoses						
AD/HD, CD	10	321	0.76	0.57	0.96	27%
Cerebral Palsy	1	8	-0.06	-1.04	0.92	-
NSDD	3	48	0.81	0.39	1.23	0%
ASD*	6	168	0.41	0.05	0.77	61%
Children's Age						
Five years and older	6	137	0.18	-0.57	0.94	88%
Younger than five years	15	437	0.63	0.43	0.83	48%
Parents receiving training						
Mothers only	7	205	0.64	0.44	0.84	0%
Non-specific	14	369	0.44	0.08	0.81	82%
Licensing						
Copyright	19	560	0.56	0.32	0.81	74%
Non-copyright	2	14	-0.26	-0.99	0.46	0%
Programme administrator						
Psychologist	10	313	0.38	-0.01	0.78	82%
Health practitioner	11	261	0.69	0.44	0.94	42%
Assessment tool used						
Non-PSOC	6	179	0.71	0.35	1.06	60%
PSOC	15	395	0.44	0.13	0.75	76%

Note: *k*, number if studies; *d*, overall effect size; CI, confidence interval; I^2 , measure of degree of heterogeneity; AD/HD, Attention deficit/ hyperactive disorder; CD, conduct disorder; non-specific developmental disorders; ASD, Autism Spectrum disorder; PSOC, Parenting Sense of Competence.

* Wittingham 2009 was excluded due to the participants' incorporating a significant percentage of Asperger's Syndrome (See text for detail)

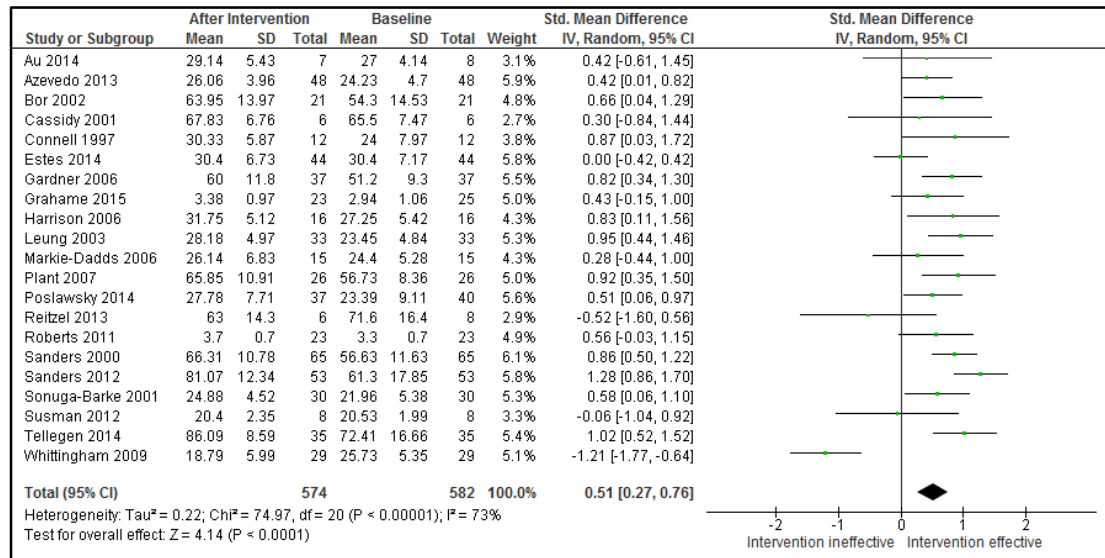


Figure 3. Random effects meta-analysis of the summative effects of parent training programmes on PSE levels.

3.2.2. Subgroup analyses

3.2.2.1. PSE according to child diagnosis (21 studies) (Appendix C. Figure C.1.)

We stratified studies according to the children's diagnoses to compare the changes in PSE across conditions. Study results showed a statistically significant effect favouring the interventions when considering the children who were diagnosed either with AD/HD ($n = 321$; SMD, 0.76 (95% CI, 0.57; 0.96); $I^2 = 27\%$) or NSDD ($n = 48$; SMD, 0.81 (95% CI, 0.39; 1.23); $I^2 = 0\%$). However, ASD ($n = 168$; SMD, 0.41 (95% CI, 0.05; 0.77); $I^2 = 61\%$) and the single study of CP ($n = 8$; SMD, -0.06 (95% CI, -1.04; 0.92); $I^2 = \text{N/A}$) each did not report a significant effect, rendering the intervention as ineffective in changing PSE levels.

3.2.1.2. PSE according to children's ages (21 studies) (Appendix C. Figure C.2)

Studies were stratified according to the mean ages of children in each study. This allowed us to compare the change in PSE for parents of children five years and older to those with children younger than five years. Parents of children aged five years and older showed that the intervention had no statistically significant effect on PSE ($n = 137$; SMD, 0.18 (95% CI, -0.57; 0.94); $I^2 = 88\%$). By contrast, parents of children younger than five years showed a statistically significant increase in PSE levels, thus favouring the intervention ($n = 437$; SMD, 0.63 (95% CI, 0.43; 0.83); $I^2 = 48\%$).

3.2.1.3. Comparing PSE levels between gender of parents receiving the intervention (21 studies) (Appendix C. Figure C.3)

We considered whether PSE levels assessed in mothers receiving interventions differed with interventions not specifying the target gender of the parents nor stratifying the PSE results measured according to the gender of the parents. The results indicated that mothers alone, had a statistically significant effect in PSE levels receiving these interventions ($n=205$; SMD, 0.64 (95% CI, 0.44; 0.84); $I^2=0\%$). This effect, although not as large an SMD, was also apparent in studies with interventions targeting either parent or, not specifying which parent completed the PSE measure ($n=369$; SMD, 0.44 (95% CI, 0.08; 0.81); $I^2=82\%$).

3.2.1.4. Intervention types (21 studies) (Appendix C. Figure C.4)

Studies were stratified according to whether they were copyright / trademark interventions compared to non-licensed interventions. Copyright/trademark interventions showed a statistically significant effect for enhancing PSE levels ($n=560$; SMD, 0.56 (95% CI, 0.32; 0.81); $I^2=74\%$). In contrast, non-licensed interventions were ineffective for enhancing PSE levels and had an effect which was non-significant ($n=14$; SMD, -0.26 (95% CI, -0.99; 0.46); $I^2=0\%$).

3.2.1.5. Comparing PSE levels according to qualification of programme administrator (21 studies) (Appendix C. Figure C.5)

We considered whether studies using health practitioners to facilitate the interventions showed variability in the effectiveness of the PSE outcomes compared to those that were psychologist-facilitated. Health practitioners administering parent training programme showed a statistically significant effect favouring the intervention ($n=261$; SMD, 0.69 (95% CI, 0.44; 0.94); $I^2=42\%$). Where psychologists administered parent training programmes, results failed to show a statistically significant effect favouring the intervention ($n=313$; SMD, 0.38 (95% CI, -0.01; 0.78); $I^2=82\%$).

3.2.1.6. PSE levels according to assessment tool (21 studies) (Appendix C. Figure C.6)

PSE levels were compared according to the assessment tools used to measure PSE. Subgroup results of studies employing the PSOC assessment tool (those reporting on PSOC total scores or PSOC efficacy scores) showed a statistically significant effects on PSE levels favouring the interventions ($n=395$; SMD, 0.44 (95% CI, 0.13; 0.75); $I^2=76\%$). Likewise, studies employing non-PSOC PSE assessment tools also showed statistically significant effects on PSE levels favouring the interventions ($n=179$; SMD, 0.71 (95% CI, 0.35; 1.06); $I^2=60\%$).

3.3. Effects of Heterogeneity

We moderator analyses to assess the percentage of variability in the effect sizes across the parent training programmes for parental self-efficacy (PSE) in each subgroup analysis that was present. When exploring heterogeneity of the summative assessment for PSE measures, a substantial percentage of heterogeneity was present $I^2 = 73\%$. Removing the Whittingham, Sofronoff, Sheffield et al. (2009) study reduced the heterogeneity to $I^2 = 46\%$ and resulted in an increase in the effect size ($n = 545$; SMD, 0.63 (95% CI, 0.45; 0.80); $I^2 = 46\%$). For the subgroup analysis according to diagnosis, we present ASD results without Whittingham (2009) given that the participants within this study comprised a large percentage of Asperger's Syndrome which may have contributed to the high degree of heterogeneity of 85% before its removal.

3.4. Risk of bias for all included studies

A graphical representation of the risk of bias assessments is presented in Figure 3. Components assessing bias included blinding, allocation, incomplete outcome data, selective reporting and other potential sources of bias. The components were rated as being either adequate, inadequate or unclear (JPT Higgins & Green, 2009). The majority of studies provided limited information regarding aspects of randomisation (specifically allocation concealment and sequence generation). Sequence generation was either rated as having a low risk of bias or being unclear, similarly allocation concealment was primarily rated as being unclear. Participant blinding made up the highest risk of bias, with 19% of studies reporting a high risk of performance bias. Due to the nature of all RCTs as included studies having a control which consisted of no treatment or treatment as usual, blinding of participants to group allocation was not possible. Detection and attrition bias were reported as high in two studies, making up nearly ten percent of studies reviewed.

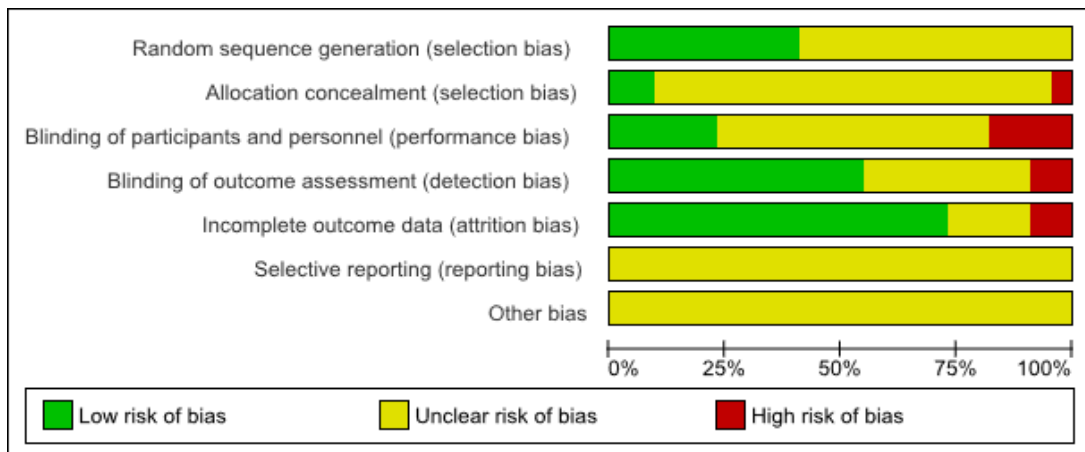


Figure 4. Risk of bias assessment for included studies according to Cochrane risk of bias tool (Higgins & Altman, 2008)

4. Discussion

This study is the first systematic review to evaluate the effects of parent training programmes on parental self-efficacy (PSE) levels for parents with young children diagnosed with developmental or conduct disorders. We used meta-analytic techniques to assess PSE across six different outcome categories. The primary outcome category of interest was the change in PSE levels of those parents receiving any form of parent training programme meeting the inclusion criteria. The secondary outcome categories compared PSE levels by stratifying studies according to the children's diagnoses, the mean ages of the children and the target parent receiving the intervention. In addition, we compared licenced (copyrighted/trademarked) studies to non-licenced studies, followed by comparing psychologist-administered interventions to health practitioner administered interventions. Lastly, PSE levels for studies using the PSOC were compared to those utilising non-PSOC assessment tools. A number of these secondary outcomes are discussed in 4.1 below. We also discuss heterogeneity and risk of bias assessments. We conclude with the strengths and limitations of the study, as well as future research directions.

4.1. Main findings

Our primary findings suggest that overall, parent training programmes are effective in enhancing PSE levels for the population meeting the inclusion study criteria. These findings are analogous to Ardelt and Eccles's (2001) model that shows that the level of PSE is directly proportional to parents' own optimistic beliefs, outlooks, and attitudes, and leads to subsequent heightened levels of success in the child (Ardelt & Eccles, 2001). Thus, an increased PSE level may promote child development and adjustment outcomes (Ardelt & Eccles, 2001; P. K. Coleman & Karraker, 2003).

4.1.1. PSE according to child diagnosis

An earlier systematic review of the Stepping Stones Triple-P programmes indicated that PSE levels for parents of children with a variety of developmental disorders increased after training (Tellegen & Sanders, 2013). Our findings suggest that an increase in PSE levels may be dependent on the children's diagnoses; specifically, studies directed at parents of children diagnosed with CP indicated that parent training programmes were ineffective in changing PSE levels in the single CP study by Susman (2012), which targeted parents of children diagnosed with CP. A likely reason for this finding may have resulted from not including elements of vicarious learning or mastery experience into the parent training programme.

Also, the findings of the study may be due to a poor rating in terms of risk of bias, with unclear risk scores for randomisation and allocation concealment. The latter having been shown to greatly influence the outcome of studies (Schulz, Chalmers, Hayes, & Altman, 1995). Harrison (2006), as well as Plant and Sanders (2007), assessed programmes on children with various diagnoses that included children with CP and both of these studies had outcomes favouring intervention. For the ASD subgroup, there was significant heterogeneity which, upon further investigation with the removal of Whittingham et al., (2009) demonstrated a significant combined effect, thus suggesting that future studies are warranted where there is a specific assessment of parent training programmes for parents of children diagnosed with CP, given the dearth of studies in this arena.

4.1.2. Age

In this study, we observe that PSE levels had a significant increase for parents of children younger than five years of age, irrespective of the condition. Our findings suggest that intervention at an early age is thus, more beneficial in terms of PSE outcomes than training initiated after the child is five years of age. These findings corroborate the increasing body of empirical evidence favouring early intervention suggesting it to have beneficial effects on the biopsychosocial aspects of parents and children (Dunst, 2007; Moolman-Smook et al., 2008; Wetherby et al., 2014).

4.1.3. Parents

This review further indicates that interventions only targeting mothers as the receiver of the intervention showed a greater increase in PSE than those studies not differentiating between which parents ought to receive the intervention. This result corroborates research which shows that PSE may have different effects for a mother than fathers (Hastings & Brown, 2002; Sevigny, 2013). This is a particularly valuable insight for training programmes being implemented in LAMI country settings, as the primary caregiver is usually the mother. Fathers are often absent, due to the migrant nature of their work, as well as other cultural and historical considerations (Richter, Chikovore, & Makusha, 2010).

4.1.4. Intervention characteristics

Non-psychologist administered parent training programmes were shown to be effective, as opposed to those administered by psychologists which failed to show a statistically significant effect on PSE levels. Findings in this review are similar to a systematic review conducted by Reichow et al. (2013) that assessed non-specialist delivered parent training programmes;

their findings suggested non-specialist delivered parent training programmes to have positive effects on family outcomes including children with developmental disorders (Reichow et al., 2013). This data is promising within the LAMI setting as many LAMI countries are faced with a dearth of resources, and employ very few specialised health practitioners and psychologists (Dua et al., 2011; Eaton et al., 2011; Kieling et al., 2011; Patel, Singh, & Desai, 2009; World Health Organization, 2007). As a result, task shifting has been suggested as a way to maximise access to interventions within these contexts (Flisher, Sorsdahl, Hatherill, & Chehil, 2010; Rahman et al., 2008). These results suggest that parent training programmes are equally effective when carried out by a number of allied health professionals. Studies assessing alternative cadre professionals such as rehabilitation care workers, or community-based carers delivering parent training programmes have also shown to be effective (Flisher et al., 2010; Rahman et al., 2008). In addition, we suggest that future research should determine how parents trained by psychologists and other health practitioners compare with regard to other outcomes namely, parental stress, depression and anxiety, parenting quality of life together with the child outcome measures typically targeted in these interventions, as we did not pursue these outcomes in this review. Findings also revealed that licenced (copyright and/or trademarked) interventions enhance PSE levels, whereas the two studies that administered non-licenced interventions did not have a significant effect on PSE. Researchers in LAMI settings interested in designing parent training programmes may need to consider adapting the theoretical design of licenced interventions by including elements known to affect PSE levels.

4.1.5. Outcomes of interest

As hypothesised, PSE levels generally have shown to increase in parents following intervention, this being the primary outcome of interest pertaining to this review. As there were significant standardised mean differences for all interventions in enhancing PSE levels. When comparing the PSE levels of studies using the PSOC to the studies measuring PSE levels employing less frequently utilised PSE assessment tools, the effect sizes remained statistically significant. Thus, we are able to state that parental self-efficacy is a robust parent outcome measure to evaluate the effectiveness of parenting programmes included in this systematic review. However, according to Oettingen (1995) the nature of efficacy sources that carry value for a person, as well as the importance they place on these sources is influenced by the person cultural identity (Oettingen, 1995). Consequently, it remains pivotal that we now gather empirical data to support the use of PSE within more collectivistic cultures, as most of

the data collected in this review originate from countries where a more individualistic culture dominates.

4.2. Findings on the effects of Heterogeneity

For the primary outcome measure, it appeared as though there was a substantial amount of heterogeneity. Thus, we employed the random-effects model throughout. When removing the study by Whittingham et al., (2009), heterogeneity decreased considerably, and the effect size increased. In this study, 12 of the 29 children were diagnosed with Asperger's syndrome, which may have resulted in children in this sample possessing relatively strong language abilities and milder difficulties with social interaction as compared to children with a diagnosis of Autism. Furthermore, 17 of the 29 parents did not seek help for their child's emotional or behavioural problems, which suggests that these parents may have experienced relatively less stress than parents of children with autism may experience. Heterogeneity may have also been attributable to the high risk of performance and detection bias presented in this study.

4.3. Risk of bias within studies

The risk of bias was evaluated within all 21 RCTs as per PRISMA recommendation (Moher et al., 2009). The assessment indicated that some studies potentially were at high risk of performance bias, followed by detection and attrition bias, including allocation concealment. Studies generally did not report enough information for us to determine the likelihood of risk of bias. These biases should be carefully considered in the design and implementation of future RCTs involving parent training programmes. Similarly to suggestions by Tellegen and Sanders (2013), future studies ought to try diminishing any possibility risks of bias, and describe their procedures with adequately (Tellegen & Sanders, 2013).

4.4. Strengths

While there have been systematic reviews supporting the effectiveness of parent training programmes for parents of children with developmental and conduct disorders such as Skotarczak and Lee (2015) as well as Tellegen and Sanders (2013), this review is the first to evaluate the effectiveness these interventions have in changing the PSE levels. We used PRISMA proposed guidelines to assess risk of bias for all included studies (Moher et al., 2009). This review only analysed RCTs, thus, interventions and control arms were exchangeable. Furthermore, no language limitations were set, thus allowing us to include studies conducted anywhere in the world. This review also included published and unpublished studies to

decrease publication biases. When investigating parent training programmes we chose to include all forms of parent training, rather than selecting specific programmes, as others have previously done. This allowed us to explore whether or not parent training programmes, in general, have a positive effect on PSE levels. The majority of parenting training programmes including in this review have the potential to be adapted for implementation in a LAMI context. In addition, the results showed interventions administered by health practitioners other than psychologists to be effective in enhancing PSE levels. This suggests that task shifting of parent training programmes to health practitioners other than psychologists is feasible. Furthermore, results revealed licenced interventions have a greater effective than non-licenced ones, indicating the need for evidence-based practice in treating children with developmental disorders. It also highlights the need to apply the theoretical underpinnings evident in existing programmes to the development of training material for implementation in a LAMI context. Another strength of the study was that the search terms did not limit certain regions or countries and, where necessary, articles not written in English were translated. However, it is still evident that no studies conducted in LAMI countries met the inclusion criteria. Finally, early commencement of intervention was shown to have a greater effect for those parents of children younger than five years of age, which once again reinforces the important of early intervention for children with developmental disabilities and their families. This has great value for policy makers and those with an interest in public health.

4.5. Limitations and future research directions

A limitation in trying to provide summative estimates of the effectiveness of parent-based interventions, was the varied nature and poor description of interventions. In addition, numerous sources of bias were identified such as the fact that intention-to-treat analysis was not regularly used. Furthermore, some studies with attrition failed to contact participants who were lost to follow up. Also, this review was unable to retrieve RCT studies conducted in LAMI countries. Nevertheless, this review provides evidence for the promise of the use of parent training programmes in enhancing PSE levels in parents of children with developmental disorders. Lamb (2004) strongly argues the need for future studies to assess the impact of these programmes on fathers, due to the shortage of data pertaining to fathers and the increasingly important roles they play in their children's development in the last three decades (Lamb, 2004).

5. Conclusion

The results of the current systematic review presented evidence to suggest parent training programmes have a significant effect on the enhancement of self-efficacy levels for parents of children with developmental or conduct disorders.

Clinical implications

Results of this systematic review offered some clinical understandings to health practitioners working with parents of children with developmental or conduct disorders. Firstly, the results showed that parent training programmes had an overall effectiveness in enhancing PSE levels. Secondly, parents of children younger than five years of age have a greater increase in PSE levels than those with children older than five years. Thirdly, studies measuring PSE levels in mothers showed greater gains than studies measuring PSE levels of fathers and mothers as a combined outcome, suggesting that mothers appear to have benefitted more than fathers have from participating in these programmes. Fourthly, studies investigating interventions with copyrights or trademark licencing most likely have many years of research and an abundance of published evidence in support of their efficacy, and it is therefore not surprising that results from this study thus confirmed these interventions to have greater benefits than non-licenced studies. The penultimate clinical implication is that health practitioners other than psychologists are successfully able to implement training programmes that enhance PSE. Lastly, the results showed that PSE levels increased regardless of the assessment tool used to measure PSE. These findings are important given the dearth of health practitioners in LAMI settings able to provide children diagnosed with developmental or conduct disorders with appropriate care. Although no studies were found which measured PSE to have been conducted and interventions designed for LAMI settings, it may be viable to adapt existing parent training programmes to be implemented in LAMI settings (Reichow et al., 2013).

Contributors

MH conceived of the study and all authors were responsible for designing the protocol. AH and MH selected the articles and extracted the data. AH performed the analysis under the critical guidance of MEE. AH wrote the first draft. All authors critically revised successive drafts of the manuscripts and approved the final version.

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